City of Casa Grande
Small Area Transportation Study

(Project Number: X5-310-012)

Final Report

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1.0 INTRODUCTION

1.1 STUDY CONTEXT

The Casa Grande Small Area Transportation Study (SATS) was initiated by the City of Casa Grande in conjunction with the Arizona Department of Transportation (ADOT). The City of Casa Grande retained a consultant team led by Wilson & Company, Inc., Engineers & Architects of Phoenix to conduct the study under the direction of a Technical Advisory Committee (TAC), which includes representatives from the City of Casa Grande, Pinal County, the Central Arizona Association of Governments (CAAG), ADOT, the City of Maricopa, the City of Eloy, the City of Coolidge, and the Gila River Indian Community (GRIC).

This study represents an expanded update and expansion of the *Casa Grande Multimodal Transportation Study* prepared by Lima & Associates in 2001. In addition, this study was coordinated with the 2006 *Pinal County Small Area Transportation Study* and study recommendations will also be referenced by the ADOT I-10 Regional Profile Study.

Key elements of the SATS work program include the following:

- Review of previous plans and studies
- Inventory of existing conditions, including safety
- Socioeconomic and land use projections
- Travel demand model development, calibration and application
- Analysis of future conditions
- Development of transportation plan alternatives
- Evaluation of alternatives
- Development of alternative transportation funding scenarios
- Implementation plan for the preferred alternative
- Transit element
- Heavy truck route element
- Stakeholder coordination
- Public Outreach and City Council Study Sessions

The goal of the study is to develop a comprehensive regional transportation plan for the City of Casa Grande and the greater Casa Grande planning area that will guide multi-modal planning for both sub-regional and local facilities. Further, this study presents implementation and programming recommendations over a 20-year timeframe for improvements to the local circulation system comprised of City of Casa Grande or Pinal County roadway segments. While this study included roadway facilities owned and operated by ADOT within the study area, it is important to recognize that no recommendations have been made for improving any of these facilities. Rather, ADOT will conduct a Regional Transportation Profile to specifically recommend improvements to the state highway system located within the study area

established for the Casa Grande Small Area Transportation Study. State facilities to be addressed in this future study include:

- Interstate 10
- Interstate 8
- SR-387 (Pinal Avenue)
- SR-287 (Florence Boulevard)
- SR-84 (Gila Bend Highway

A two-level planning framework was established to address mobility and accessibility needs:

- Regional – The City of Casa Grande aims to sustain growth and desirable development patterns by providing a high level of access to and from neighboring cities, including the Phoenix metropolitan area, the Tucson metropolitan area, the City of Maricopa, the City of Eloy, and the City of Coolidge.
- Subregional – This study provides an arterial framework to meet mobility needs of existing and future residents within the urban core and developing suburban portions of the community. (Between new residential developments along Val Vista Boulevard and Montgomery Road with shopping and employment centers in central Casa Grande)

1.2 STUDY AREA OVERVIEW

Located near the intersection of I-10 and I-8, the City of Casa Grande has interstate access to the two major Arizona metropolitan centers, Phoenix and Tucson. Casa Grande also has interstate highway access to Yuma and southern California. In addition to the junction of I-10 and I-8, several other state routes converge within the downtown area: SR 387 (Pinal Avenue), SR 84 (Gila Bend Highway) and SR 287 (Florence Boulevard).

By rail, the City of Casa Grande connects to Yuma and southern California to the west, and to Tucson and El Paso, Texas, to the east.

The study area, shown in Figure 1-1, encompasses more than 270 square miles. It is bounded by the Gila River Indian Community on the north., the Tohono O'Odham Nation and the City of Eloy to the south, Fuqua Road to the west, and 11-Mile Corner Road to the east.

1.3 REPORT ORGANIZATION

This report is organized into seven chapters, as follows:

1.0 Introduction

Provides background information and sets the stage for the study.

2.0 Transportation Goals, Objectives and Policies

Taken from the *City of Casa Grande General Plan 2010*, this chapter outlines the transportation goals, objectives, and policies that guided the preparation of this transportation study.

3.0 Methodologies and Standards

Presents the methods used to evaluate the Casa Grande area transportation system under current and future conditions.

4.0 Current Conditions

Describes year 2005 transportation facilities, services, and conditions throughout the Casa Grande Study Area.

5.0 Future Conditions

Outlines the population and employment growth forecasts for the study area and details the roadway improvement needs to accommodate future travel demand. It presents the recommended roadway improvement program for the years 2010, 2020, and 2030.

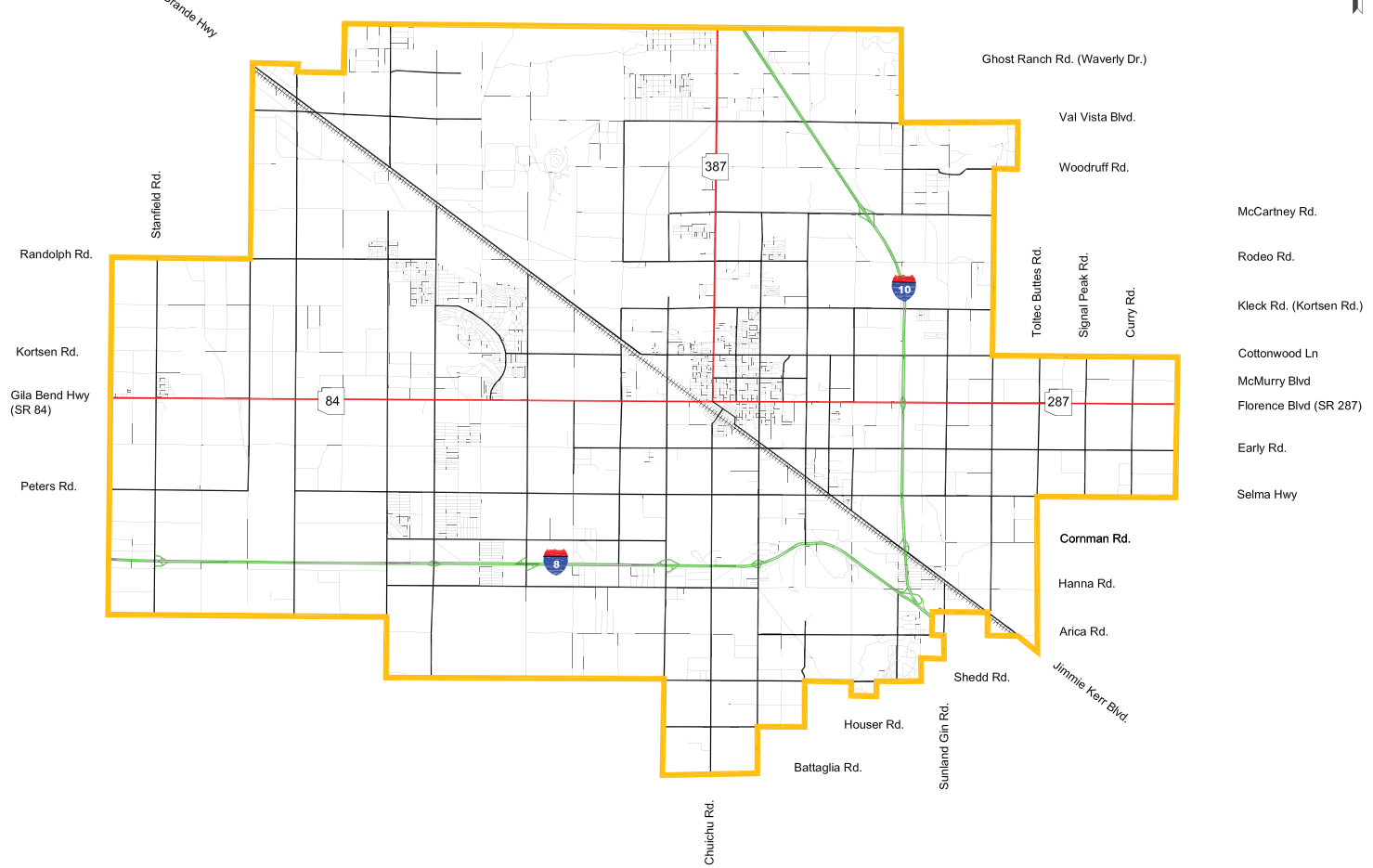
6.0 Implementation Program

Presents the future roadway functional classification plan together with the transportation revenue outlook and a list of recommended transportation improvement projects. This chapter also lists key transportation plan implementation action items.

7.0 Policies and Guidelines

Details typical roadway design criteria by functional classification, strategies for access management, and guidelines for traffic impact analyses.

STUDY AREA AND MAJOR ROADWAY NETWORK



Study Area

FIGURE 1-1

2005 Casa Grande Small Area Transportation Study

1.4 PREVIOUS PLANS AND STUDIES

The jurisdictions involved in the Casa Grande SATS have prepared numerous transportation and land use plans and studies. Specific documents consulted during the preparation of this transportation study include:

- *Casa Grande Multimodal Transportation Study*, Lima & Associates, 2001.
- *Casa Grande Transit Feasibility Study*, Lima & Associates, 2001.
- *City of Casa Grande General Plan 2010*, Partners for Strategic Action, 2001.
- *City of Maricopa Small Area Transportation Study*, Lima & Associates, 2005.
- *Pinal County Corridor Definition Study*, Arizona Department of Transportation, 2005.
- *Maricopa Association of Governments 2030 Placeholder Projections*, 2003.
- *Pinal County Small Area Transportation Study*, Kirkham Michael Consulting Engineers, 2006.
- *Traffic Engineering Evaluation: SR 287 (Florence Blvd.) Milepost 111.76 to Milepost 115.87, Arizona Department of Transportation*, Baja Regional Traffic Engineering, 2003.
- *Traffic Engineering Evaluation: SR 387 (Pinal Ave.) Milepost 0.00 to Milepost 8.60, Arizona Department of Transportation*, Baja Regional Traffic Engineering, 2003.

1.5 COMMUNITY INVOLVEMENT

The Casa Grande SATS public involvement program provided opportunities for meaningful community and stakeholder input in the long range transportation planning process. The following sections summarize key components of the public involvement program.

1.5.1 TECHNICAL ADVISORY COMMITTEE MEETINGS

The Technical Advisory Committee (TAC) was formed at the onset of the study. With key stakeholders participating in developing the project work program. TAC meetings were held at major project milestones to review study results and provide guidance to the planning process. Throughout the study, the TAC members have kept their respective agency or group informed on the planning process, and brought appropriate issues that required technical analysis to the attention of the project team. Members of the TAC included:

Dianne Kresich, ADOT
Reza Karimvand, ADOT
Bret Anderson, ADOT
Kevin Louis, City of Casa Grande
Rick Miller, City of Casa Grande
Doug Hansen, Pinal County
Bill Leister, CAAG
Jim Moline, GRIC
Bob Jackson, City of Maricopa
Brent Billingsley, City of Maricopa
John Mitchell, City of Eloy
C. Alton Bruce, City of Coolidge

1.5.2 COMMUNITY INTERVIEWS

A series of interviews with community representatives were conducted by the project team in July 2005 to understand key transportation related issues and concerns within the Casa Grande study area. These issues and concerns were subdivided into topics for consideration during the course of the study.

Roadways and Traffic

- Additional roadway capacity is needed between Casa Grande and Phoenix.
- Traffic circulation should be enhanced by identifying alternative corridors to Florence Boulevard and Pinal Avenue.
- Additional traffic interchanges on I-10 and I-8 should be provided.
- A regional heavy truck route plan should be identified to reduce the impact of heavy truck traffic on central Casa Grande residential and commercial areas.
- A loop expressway system around Casa Grande using Montgomery Road and Val Vista Boulevard should connect I-10 and I-8.
- Some study area corridors have higher than average crash rates.
- Access management guidelines and standards should be applied consistently.
- New facilities should provide pedestrian and bicycle amenities in a system of logical linkages.

Public Transit

- Use of alternative modes should be encouraged.
- Transit service is needed to satisfy retired/elderly mobility needs with access to key activity centers in central Casa Grande.

Non-Motorized Transportation

- Gaps in bicycle network connectivity should be closed.
- There is a need to provide continuous bicycle lanes to reduce potential conflicts with trucks.
- Curb cuts and access points should be consolidated to improve bicycle and pedestrian safety.

A summary of these interviews is presented in Appendix A – Summary of Public Comment.

1.5.3 PUBLIC OPEN HOUSES/CITY COUNCIL STUDY SESSIONS

Public open houses were scheduled at key points in the planning process. The first public open house was held on Monday, December 12, 2005, at the Casa Grande City Hall. This initial meeting presented the planning process to the public together with an assessment of existing conditions. The goal of the meeting was to confirm the work program and identify key transportation concerns. The presentation included a

project newsletter and graphic displays. Comment cards were distributed to solicit written comments from the public. In a separate study session with the Casa Grande City Council on the same date, the project team briefed the council on the study work program.

A second public open house was held on Monday, November 20, 2006. At this second meeting, the project team presented recommendations for improvements to the study area transportation system through the year 2030. The presentation included a detailed project newsletter with maps and graphic displays. Comment cards were distributed to solicit written comments from the public. In a separate City Council study session, the project team gave a slideshow overview of the transportation plan recommendations.

The Public Involvement Summary Report for each open house is included in Appendix A.

2.0 TRANSPORTATION GOALS, OBJECTIVES, AND POLICIES

The *City of Casa Grande General Plan 2010* transportation/circulation goals, objectives and policies were used as guide in the preparation of this transportation plan. This chapter excerpts the key goals, objectives and policies from the City's current General Plan. This chapter is structured according to the following major topics:

- Land Use and Transportation/Circulation Integration Policies
- Roadway and Streetscape Policies
- Public Transportation Policies
- Non-Motorized Circulation Policies
- Regional Circulation Planning Policies
- Municipal Airport Polices
- Railroad Transportation Policies

2.1 LAND USE AND TRANSPORTATION/CIRCULATION INTEGRATION

The City's circulation system is an integral part of the overall development pattern of the City. The land use densities and intensities as shown on the General Plan Land Use Plan provide the basis for the development of appropriate transportation facilities. The design of the circulation system and the level of accessibility can strongly influence the locations and intensities of land uses, as well as determine the community's ability to accommodate increased growth. The following policies are intended to direct efforts that integrate a functional, multimodal circulation system with existing and future land uses in the City of Casa Grande.

Goal 1.0 ***Promote a transportation system of arterial, collector, and local streets capable of accommodating the anticipated travel demands of the Land Use Element of the general plan.***

Objective 1.1 **The general plan shall include compatible, consistent, and integrated Land Use and Transportation/Circulation Elements.**

Policy 1.1.1 The Transportation/Circulation Element shall define the multimodal transportation facilities necessary to adequately serve the land uses specified in the Land Use Element. A proposed change or modification in either element shall be preceded by an evaluation of the land use and multimodal transportation impacts in order to ensure compatibility between the elements.

Policy 1.1.2 The City shall address transit, pedestrian, bicycle, and equestrian facilities for proposed land use developments in order to facilitate the transportation circulation system.

Objective 1.2 **Proposed land uses shall not overburden the City's circulation system.**

Policy 1.2.1 The City shall monitor the impacts of land use on transportation demand to ensure that the circulation system is not overburdened.

Policy 1.2.2 The City will actively coordinate land use development and transportation decisions.

2.2 ROADWAY AND STREETSCAPE POLICIES

The functional network of roadways is the backbone of the circulation system. The roadways are used not only for automobile travel, but also serve bicycle, pedestrian, and freight movement needs throughout the City. This system ensures that each roadway functions consistently with its intended use. The policies contained in this section are intended to encourage design standards, which promote the efficiency and safety of the circulation system.

Goal 2.0 ***Adopt arterial, collector, and local roadway design standards to accurately reflect travel function and anticipated travel volumes based upon development density and intensity.***

Objective 2.1 **The Transportation/Circulation Element shall identify a roadway system that recognizes the importance of the use and function of each roadway classification.**

Policy 2.1.1 The City shall plan, design, and implement a roadway system based upon a roadway functional classification system. Functional classification is the process by which streets in a roadway network are grouped into classes according to the service that the roadway is intended to provide.

Policy 2.1.2 The City shall adopt design standards for all streets in accordance with their functional classification and recognized design standards.

Policy 2.1.3 The City will utilize right-of-way standards as established by the Arizona Department of Transportation (ADOT) for Pinal Avenue, Florence Boulevard and the Gila Bend Highway. The City of Casa Grande will coordinate with ADOT, Pinal County, and the Central Arizona Association of Governments to identify regional options for relieving growth of future traffic demands on these transportation facilities.

Policy 2.1.4 The City shall ensure that bridges are designed to accommodate a design year storm cross-section to commensurate with planned roadway improvements. Low-flow crossing designs shall be developed for local and collector street wash crossings where traffic volumes do not warrant construction of a bridge.

Policy 2.1.5 Installation of new traffic control devices shall be based upon established warrants and professional analysis in order to ensure traffic safety.

Policy 2.1.6 The City shall seek opportunities to improve existing vehicular and pedestrian rail crossings to provide safe mobility.

Policy 2.1.7 Installation of new traffic signals shall include preemptive devices to facilitate decreased response travel times for emergency vehicles.

Goal 3.0 ***Establish guidelines regarding safety and appropriate access control to and from arterial streets and adjacent properties.***

Objective 3.1 **The City of Casa Grande shall specify appropriate guidelines regarding driveway access spacing and street intersection spacing in order to maintain capacity, efficiency, and safe traffic flow on City streets.**

Policy 3.1.1 The City shall update driveway spacing and location requirements on arterial and collector streets to provide appropriate access to property in a manner that is not detrimental to traffic flow or traffic safety.

Policy 3.1.2 The City shall establish street intersection spacing and alignment requirements in order to establish a consistent and contiguous network of streets in the community.

Policy 3.1.3 The City may require the consolidation of driveway access points along roadways classified as arterial when the arterial street is improved in order to enhance and protect the capacity and safety of the circulation system and reduce potential traffic conflicts.

Policy 3.1.4 The City will establish an ongoing process in cooperation with ADOT to coordinate zoning and subdivision approval with ADOT's access permitting process.

2.3 PUBLIC TRANSPORTATION POLICIES

The availability of public transportation to, from, and within the City of Casa Grande is an integral part of Casa Grande's transportation system. Public transit plays an essential role in guaranteeing mobility to individuals and households that lack other means of transportation and public investment in transit, where appropriate, has proved to be a significant economic benefit to the community. As Casa Grande grows, increased use of public transportation in the future may provide additional benefits such as reduced congestion and improved air quality. For public transportation to be successful, it should be planned so that it is convenient, accessible, dependable, and targeted to address unmet local and regional transportation needs. The following policies are intended to provide guidance in establishing an expanded public transportation system to serve the needs of the City and the region.

Goal 4.0 ***Provide or facilitate the provision of local and regional public transportation service in areas or markets where unmet transportation needs exist.***

Objective 4.1 **The Transportation/Circulation Element of the general plan should promote convenient and efficient public transportation as an alternative to the automobile.**

Policy 4.1.1 The City of Casa Grande shall support the use of public transportation where demand and cost effectiveness can be demonstrated.

Policy 4.1.2 The City shall work with Pinal County, ADOT, or private transportation providers to meet the demand for public transportation in the City as well as between Casa Grande and neighboring communities.

Policy 4.1.3 The City shall coordinate with local and regional publicly funded and private transportation providers in the promotion and coordination of their services and promote public awareness of service availability.

Policy 4.1.4 The City shall coordinate with Amtrak in providing a rail stop in the City. The City shall also be encouraged to preserve the existing Railroad Depot located in the downtown core.

2.4 NON-MOTORIZED CIRCULATION POLICIES

Non-motorized circulation, including bicycling, walking, and equestrian modes can provide efficient and enjoyable means of transportation and recreation for people of all ages. The City of Casa Grande has numerous opportunities to establish bikeways, pedestrian, and equestrian facilities along City streets, utility easements, canals, and scenic off-road areas. The following policies encourage the development of functional bicycle, pedestrian, and equestrian facilities that address transportation needs and provides a system of facilities throughout the community.

Goal 5.0 Provide non-motorized modes of transportation through the use of bicycle and pedestrian pathways, and equestrian trails.

Objective 5.1 The City shall facilitate the use of alternative, non-vehicular modes of transportation by establishing specific and conceptual bicycle corridors throughout the City.

Policy 5.1.1 Bicycling shall be encouraged to provide a safe and healthy alternative to automobile transportation in the City of Casa Grande.

Policy 5.1.2 The following types of bicycle facilities shall be identified.

- ***Bike Path*** – A bike path is a special pathway designated for the use of bicycles (and pedestrians) where cross-flows of motorists is minimized. Bike paths are usually buffered from vehicular roadways by the use of a landscape strip or physical buffer. Bike paths may be totally separated from roadways, or utilize canal rights-of-way, utility corridors, washes, linear parks or other easements for the path. Some areas may have paved paths while others may consist of natural material or other surfaces.
- **Bike Lane** – A bike lane is a paved lane on the shoulder of a roadway that is marked for bicycle use only. Bike lanes may be found on arterial and collector streets, and are marked to alert both bicyclists and motorists that each is sharing the roadway. Bicycle lanes may be established on arterial roadways with sufficient pavement width to allow for the safety of the bicyclist.
- ***Bike Route*** – A bike route is a roadway identified as a bicycle facility by signs only. Bike routes may be identified on local streets and collector streets where traffic volumes are modest.

Policy 5.1.3 The Casa Grande Multi-Use Path Plan shall identify bikeways which link residential areas with as many primary destination points as possible, including parks, schools, open space areas and commercial facilities. This plan shall also indicate the general location of a looped recreational bicycle system in the City and surrounding area.

Policy 5.1.4 The Casa Grande Multi-Use Path Plan shall designate the specific location of bike paths, lanes, and routes as well as equestrian trails on selected City streets and off-road areas.

Objective 5.2 The Transportation/Circulation Element of the general plan shall promote the development of pedestrian facilities throughout the City to encourage walking as a mode of transportation and recreation.

Policy 5.2.1 In the pedestrian system, priority shall be given to segments, which provide safe routes to schools and/or enhance the continuity of the existing pedestrian system.

Policy 5.2.2 All new arterial and collector streets shall have improved sidewalks within the public right-of-way on both sides of the street when the street is built to ultimate specifications. Sidewalks, where possible, should be separated from the edge of the roadway by a landscaped buffer.

Policy 5.2.3 Local streets in all residential categories are required to have a sidewalk on both sides of the street.

Policy 5.2.4 The City shall promote the conversion within easements of open ditches to bicycle, pedestrian, and equestrian uses.

***Objective 5.3* The Transportation/Circulation Element of the general plan shall promote the development of equestrian trails as a safe and convenient mode of transportation and recreation.**

Policy 5.3.1 Where appropriate, off-road trails shall accommodate horseback riding.

2.5 REGIONAL CIRCULATION PLANNING POLICIES

Portions of the City's circulation system function as a linkage within the regional circulation system. It is important that the City coordinate with Pinal County, the Gila River Indian Community, and the Arizona Department of Transportation to maximize compatibility with adopted circulation plans and planned regional transportation system improvements.

Goal 6.0 Support appropriate multi-jurisdictional planning among the City of Casa Grande, Pinal County, Central Arizona Association of Governments, Gila River Indian Community, and Arizona Department of Transportation that share common transportation facilities.

Objective 6.1 **The City of Casa Grande shall support regional transportation planning programs and planning coordination with Pinal County, Central Arizona Association of Governments, Gila River Indian Community, and ADOT.**

Policy 6.1.1 The City shall coordinate efforts with adjacent jurisdictions to ensure adequate and consistent roadway widths, alignments, classifications, and improvements.

Policy 6.1.2 The City shall continue to work jointly with Pinal County to plan and improve roadways and public transportation through the formation of intergovernmental agreements.

2.6 MUNICIPAL AIRPORT POLICIES

Goal 7.0 **Provide for the future expansion of the municipal airport.**

Objective 7.1 **Ensure that land uses surrounding the municipal airport are compatible with future expansion of the airport.**

Policy 7.1.1 The City of Casa Grande shall utilize the Casa Grande Municipal Airport Master Plan to protect airspace around the airport from encroachment of incompatible land uses.

2.7 RAILROAD TRANSPORTATION POLICIES

Goal 8.0 **Ensure that industrial users in Casa Grande continue to have adequate rail service to meet their needs.**

Objective 8.1 **Increase the availability of rail sidings and tracks to industrial users in the City of Casa Grande.**

Policy 8.1.1 The City of Casa Grande shall support the development of private rail sidings that provide service to industrial developments in the City.

Policy 8.1.2 The City of Casa Grande shall coordinate improvements to, and new rail sidings with the Union Pacific Railroad Company and private industries where possible.

3.0 METHODOLOGIES AND STANDARDS

3.1 LEVEL OF SERVICE (LOS) DEFINITION

Level of Service (LOS) is a quantitative measurement of operational characteristics of traffic and the perception of the traffic conditions by both motorists and passengers. There are six levels of service defined by the *Highway Capacity Manual*, published by the Transportation Research Board (TRB). Each level of service is given a letter designation from A to F, with A representing the optimal or best condition and F the worst.

Levels of service on roadway segments is characterized by the Highway Capacity Manual as follows:

LOS A: Best, free flow operations (on uninterrupted flow facilities) and very low delay (on interrupted flow facilities). Freedom to select desired speeds and to maneuver within traffic is extremely high.

LOS B: Flow is stable, but presence of other users is noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within traffic.

LOS C: Flow is stable, but the operation of users is becoming affected by the presence of other users. Maneuvering within traffic requires substantial vigilance on the part of the user.

LOS D: High density but stable flow. Speed and freedom to maneuver are severely restricted. The driver is experiencing a generally poor level of comfort and convenience.

LOS E: Flow is at or near capacity. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within traffic is extremely difficult. Comfort and convenience levels are extremely poor.

LOS F: Worse, facility has failed, or a breakdown has occurred.

For typical long range transportation planning studies in urban areas, LOS D is usually used because it allows for a generally accepted quality of service. To maintain consistency with the *2001 Casa Grande Multimodal Transportation Study* and the *2000 Pinal County Transportation Plan*, this study uses a LOS D standard for determining future need for roadway facilities.

3.2 ROADWAY SEGMENT LEVEL OF SERVICE THRESHOLDS

This section presents the level of service thresholds utilized to analyze segment performance for freeways, arterials, and collector streets. The analysis of segment level of service is based on the number of lanes, the functional classification of the roadway, the maximum desired level of service capacity and the existing or forecasted average daily traffic (ADT) volume. The capacities used in the Casa Grande study area were based on the capacities used in the *2001 Casa Grande Multimodal Transportation Study*. Table 3-1 summarizes daily roadway directional lane capacities by functional classification.

TABLE 3-1
DAILY ROADWAY CAPACITIES

Functional Classification	Daily Per Lane Capacity
Interstate/Freeway	16,375
Arterial	8,700
Collector	7,500
Freeway Ramps	8,000

Source: Casa Grande Multimodal Transportation Study, 2001.

A volume-capacity (v/c) ratio was used to evaluate a roadway segment's LOS. The directional daily per lane capacities were used with daily traffic volume estimates to determine the associated v/c ratio. Segment level LOS was determined using the v/c guidelines shown in Table 3-2.

TABLE 3-2
LEVELS OF SERVICE

LOS	Maximum V/C
A	0.00 – 0.30
B	0.30 – 0.54
C	0.54 - 0.75
D	0.75 - 0.90
E	0.90 - 1.00
F	>1.00

Source: Casa Grande Multimodal Transportation Study, 2001.

4.0 CURRENT CONDITIONS

This section provides an overview of year 2005 socioeconomic and roadway conditions within the Casa Grande study area. It includes an updated study area population and employment estimate, an inventory of roadway facilities, an evaluation of safety conditions on key study area arterials, an assessment of heavy truck traffic, and overview of current transit operations. It also includes a list of roadway improvement projects in the Casa Grande five-year capital improvement program.

4.1 CURRENT SOCIOECONOMIC CONDITIONS

An estimate of year 2005 population and employment was developed from several sources including Census 2000 population data, historic building permit activity, and a commercial employment database. This section outlines the development of year 2005 socioeconomic estimates.

4.1.1 ENVIRONMENTAL JUSTICE

Executive Order (EO) 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) dated February 11, 1994, requires that disproportionately high and adverse human health or environmental effects on minority populations, and low-income populations of federal programs, policies and activities be identified and addressed. The U.S. Department of Transportation (USDOT) has published a Final USDOT Order to establish procedures for use in complying with EO 12898. The order defines key terms and provides guidance for identifying and addressing disproportionately high and adverse impacts to low-income and minority populations. If disproportionately high and adverse impacts would result from the proposed action, mitigation measures or alternatives must be developed to avoid or reduce the impacts, unless an agency finds that such measures are not practicable.

Congress passed Title VI of the Civil Rights Act of 1964 and related statutes to assure that individuals are not subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin, age, sex, or disability. Recipients of federal assistance for transportation-related projects are required to demonstrate compliance with all civil rights standards applicable to the specified transportation-related project, as defined in the amended Title VI of the Civil Rights Act of 1964.

Transportation improvements implemented from this study should not adversely impact such groups disproportionately. To identify and address environmental justice issues, community outreach and public involvement programs should involve under-represented populations from the planning to the implementation of any transportation improvement project. A variety of possible alternatives should be developed and considered in order to ensure all groups are fairly represented in the amount and type of transportation services provided.

Data from Census 2000 shown in Table 4-1 provides a comparison of the minority and elderly population for Arizona, Pinal County, and the City of Casa Grande. This table shows that Casa Grande has a higher proportion of minorities, which includes Black, Hispanic, Asian-American, and American Indian populations,

than Pinal County and the state as a whole. The table also shows that portion of the population age 65 and over is lower than Pinal County and is consistent with the statewide average.

TABLE 4-1
YEAR 2000 MINORITY AND ELDERLY POPULATION

Jurisdiction	Total	Total Minorities(1)	Percent Minority	Total Age 65+	Percent Age 65+
Arizona	5,130,632	1,856,374	36.2%	667,839	13.0%
Pinal County	179,727	74,086	41.2%	29,171	16.2%
City of Casa Grande(2)	25,224	12,517	49.6%	3,469	13.8%

Source: Arizona Department of Economic Security - Census Summary File 1, Census 2000.

Note: (1) A minority is a person who is Black, Hispanic, Asian American, or an American Indian/Alaska Native.
(2) City limit boundary as of April 1, 2000.

Table 4-2 shows the portion of the population between age 16 and age 64 whose mobility is limited by a disability. The census data shows that the Casa Grande portion of mobility limited population is consistent with Pinal County, and lower overall than the statewide average. The Casa Grande low income population, or those living in a household whose annual income is below poverty status, is both higher than the countywide and statewide averages.

TABLE 4-2
YEAR 2000 MOBILITY LIMITED AND LOW INCOME POPULATION

Jurisdiction	Total	Mobility Limited(1)	Percent Mobility Limited	Low Income(2)	Percent Low Income
Arizona	5,130,632	166,812	3.3%	698,669	13.6%
Pinal County	179,727	5,198	2.9%	27,816	15.5%
City of Casa Grande(3)	25,224	727	2.9%	4,024	16.0%

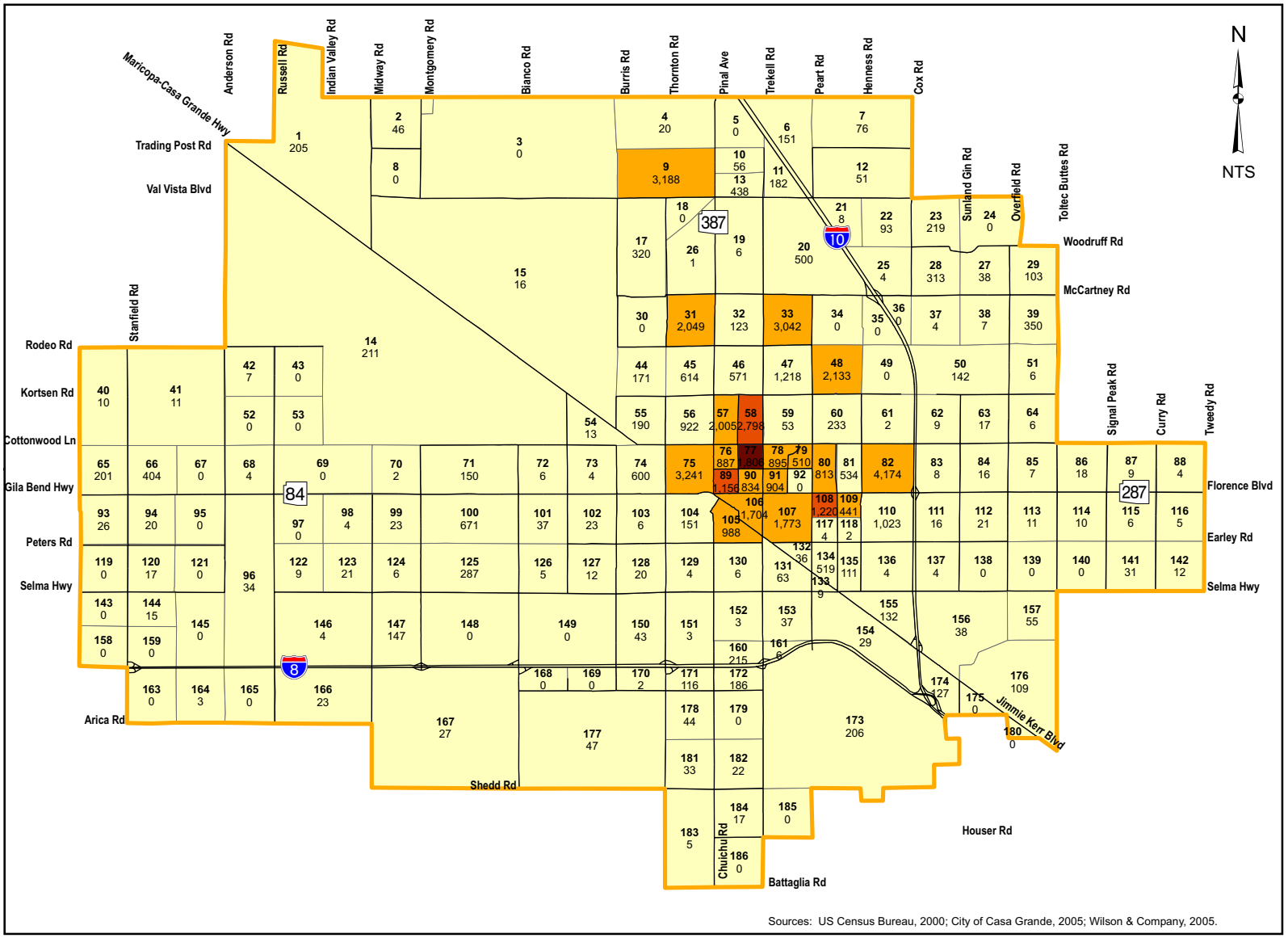
Source: Arizona Department of Economic Security - Census Summary File 3, Census 2000.

Note: (1) The mobility limited populations includes those between age 16 and age 64 with a self-care or go-outside-home disability as defined by the Census Bureau.
(2) Low-Income population includes those whose household income is at or below the Department of Health and Human Services poverty guidelines.
(3) City limit boundary as of April 1, 2000.

4.1.2 YEAR 2005 POPULATION AND HOUSING UNIT ESTIMATE

Significant growth has occurred within the City of Grande study area since the year 2000. In the 2000 census, the Census Bureau recorded 32,831 people occupying 12,783 dwelling units in the study area. City of Casa Grande data show that over 5,309 building permits were issued between January 1, 2002, and September 23, 2005, resulting in over 18,000 occupied dwelling units in the study area.

Census 2000 data showed that the number of persons living in each housing unit varied by location. The 2005 study area population was estimated by applying these observed occupancy patterns to the updated housing unit estimate. Based on this data, the Casa Grande SATS current year 2005 study area population is estimated at 51,230. Figure 4-1 shows the year 2005 estimated study area population density by traffic analysis zone.



Sources: US Census Bureau, 2000; City of Casa Grande, 2005; Wilson & Company, 2005.

YEAR 2005 ESTIMATED POPULATION DENSITY BY TRAFFIC ANALYSIS ZONE

FIGURE 4-1

2006 Casa Grande Small Area Transportation Study

4.1.3 EMPLOYMENT ESTIMATE

Employment for 2005 was estimated using a commercial employment database supplemented with input from the City of Casa Grande Economic Development Foundation. Through this process, 15,730 jobs were documented in the City of Casa Grande SATS study area. Table 4-3 shows the job totals by employment classification. Figure 4-2 shows the year 2005 estimated study area employment density by traffic analysis zone.

TABLE 4-3
CITY OF CASA GRANDE YEAR 2005 EMPLOYMENT TOTALS

Classification	Employment
Retail	5,225
Office	6,203
Government	1,009
General	3,293
Total	**15,730**

Sources: InfoUSA, 2005; City of Casa Grande Economic Development Foundation, 2005

4.1.4 SCHOOL ENROLLMENT

The Casa Grande public school system has seven elementary schools, two middle schools, and one high school. Total current year 2005 enrollment reported by the Casa Grande Elementary School District for elementary and middle schools is 6,495. Total 2005 high school enrollment reported by the Casa Grande Union High School District is 3,194. The Central Arizona Community College reported 3,300 students attending its Signal Peak Campus on Overfield Road.

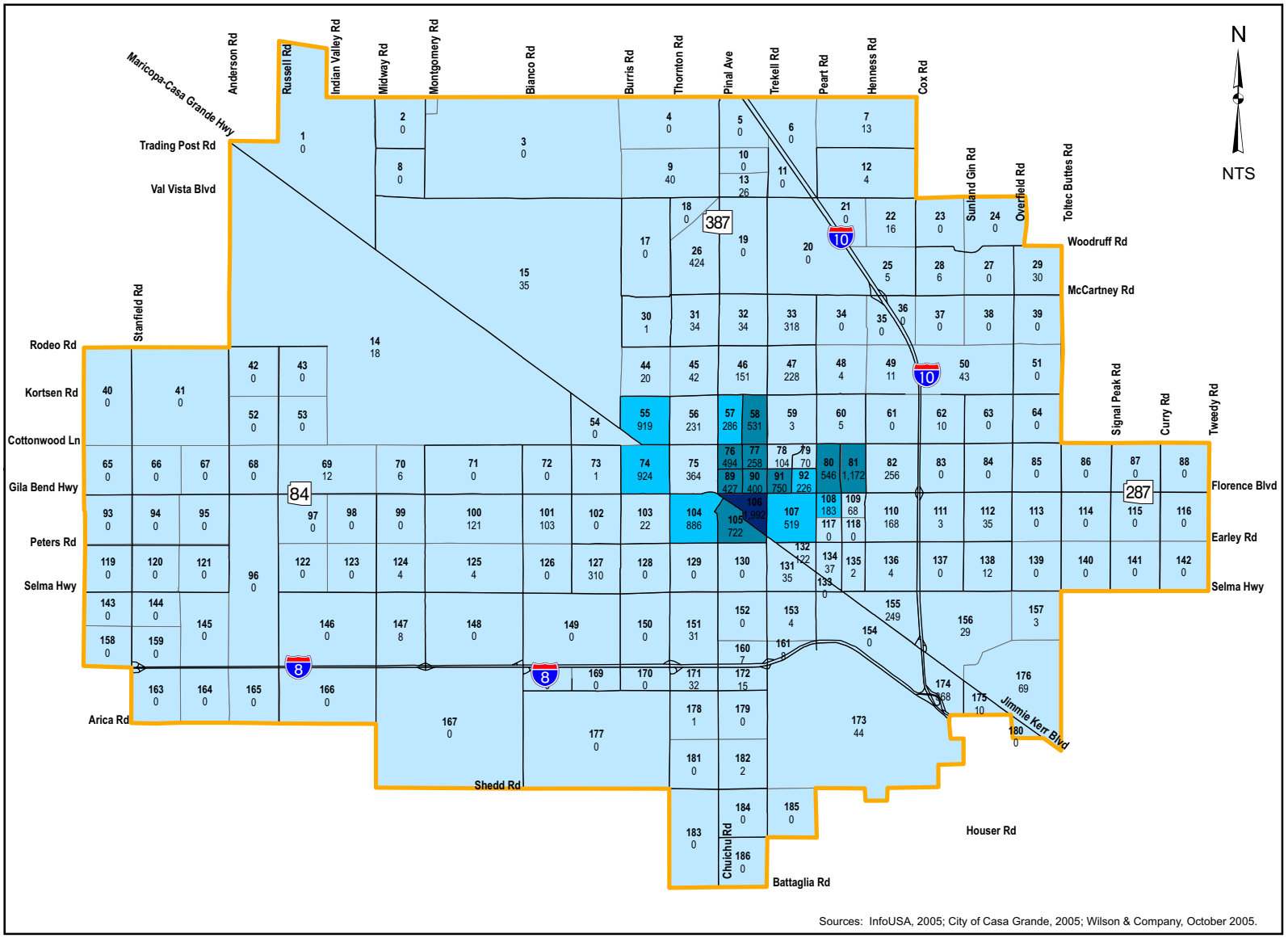


FIGURE 4-2

2006 Casa Grande Small Area Transportation Study

4.2 ROADWAY NETWORK

In an economy where just-in-time shipments are becoming increasingly important to conduct day-to-day business, moving both people and goods is paramount to an efficient transportation system. Higher order roadways, such as freeways and arterials, are the backbone of the intra-urban and inter-community system because they can move people and commodities safely and quickly. The City of Casa Grande roadway system is composed of a network of freeways, arterials, collectors, and local roadways. In addition, some multi-use paths that serve various activity centers, and public transportation provided by both private and public agencies also comprise the primary surface transportation system.

The existing roadway system consists primarily of a grid system defined by mile-section arterial roadways. The grid system is generally oriented in north-south and east-west directions. The original town site of Casa Grande follows a northwest-southeast orientation parallel and perpendicular to the Union Pacific Railroad tracks. The Maricopa-Casa Grande Highway and Jimmie Kerr Boulevard are principal arterials that run on a diagonal following the Union Pacific Railroad line. Collector roadways within the City connect residential areas to the arterial roadways, and local roads provide direct access to residential neighborhoods.

The major roadways in the study area are described below:

Florence Boulevard (SR 287) is a state principal arterial and regionally significant roadway that provides connectivity from downtown Casa Grande east to I-10 and SR 87. The roadway also connects to Pinal Avenue (SR 387) and to Gila Bend Highway (SR 84). Within the city, Florence Boulevard plays a significant role providing local circulation between commercial, governmental, and other activity centers.

Pinal Avenue (SR 387) is state principal arterial and regionally significant roadway that provides connectivity from downtown Casa Grande north to I-10. For traffic traveling between Casa Grande and the Phoenix area on I-10, Pinal Avenue is the major entryway to Casa Grande. Additionally, Casa Grande Municipal Airport is located west of Pinal Avenue and south of Val Vista Road. The four-lane roadway also serves local trips accessing commercial activities within the City.

Maricopa-Casa Grande Highway is a principal arterial and regionally significant roadway that provides access between Casa Grande and the community of Maricopa to the northwest. It connects to central Casa Grande from its alignment parallel to the Union Pacific Railroad tracks via Cottonwood Lane.

Trekell Road is a city principal arterial and regionally significant roadway that provides connectivity between residential areas in the north, the central business district, and I-8 to the south.

Peart Road is a city principal arterial that provides connectivity between residential areas in the north, commercial activity centers along Florence Boulevard, and agricultural and industrial areas located to the south.

Interstate 10 is an east-west freeway and regionally significant roadway serving longer interregional trips between California and points east. The four-lane freeway is a major transportation link that provides high-speed automobile and truck service between the Phoenix and Tucson areas.

Interstate 8 is the major route for traffic from Arizona to the southern California region. The highway intersects with I-10 in the southeast corner of the study area.

Gila Bend Highway (SR 84) is a state-owned principal arterial and regionally significant roadway that connects downtown Casa Grande west to the community of Stanfield. It joins I-8 approximately 25 miles to the west of Casa Grande.

Jimmie Kerr Boulevard is a city principal arterial that provides a connection between downtown Casa Grande and the City of Eloy to the southeast. This road parallels the Union Pacific Railroad tracks, goes beneath I-10, and continues south to Eloy.

4.3 ROADWAY CHARACTERISTICS

This section summarizes key roadway characteristics and attributes.

4.3.1 JURISDICTIONAL RESPONSIBILITY

The State of Arizona is responsible for all state routes and interstate highways in the study area. The responsibility of the City of Casa Grande extends to all non-state routes within the city limits. Pinal County administers all roadways in the unincorporated portions of the study area.

4.3.2 NUMBER OF LANES

Most roadways in the study area are two-lane facilities. Five-lane roadways are comprised of four through lanes plus a continuous center left-turn lane. Similarly, three-lane roadways have two through lanes and a continuous left-turn lane. Figure 4-3 shows the current year 2005 number of lanes on study area facilities

4.3.3 TRAFFIC CONTROL

Speed limits in the study area range from 75 mph on the interstate freeways to 25 mph on lower-level collector and local streets. The rural portions of the state routes in the study area are generally posted at 55 mph. The county roads in the study area are generally posted at 50 mph. Depending on the degree of urbanization, speed limits on state routes and principal arterials are typically 45 and 35 mph. Posted speed limits and the location of signalized intersections in the study area are shown in Figure 4-4. This figure also illustrates the ownership of each signalized intersection.

4.3.4 SURFACE TYPE

In the urbanized portions of the study area, all collector level and higher roadways including interstate and state routes, are paved. In the rural portions of the study area, the only streets that are paved in addition to the interstate and state routes are the major one-mile grid arterial streets. However, many of the arterial streets, particularly in the western part of the study area, are unpaved. Roadway surface types in the study area are shown in Figure 4-5.

EXISTING YEAR
2005 NUMBER OF
LANES

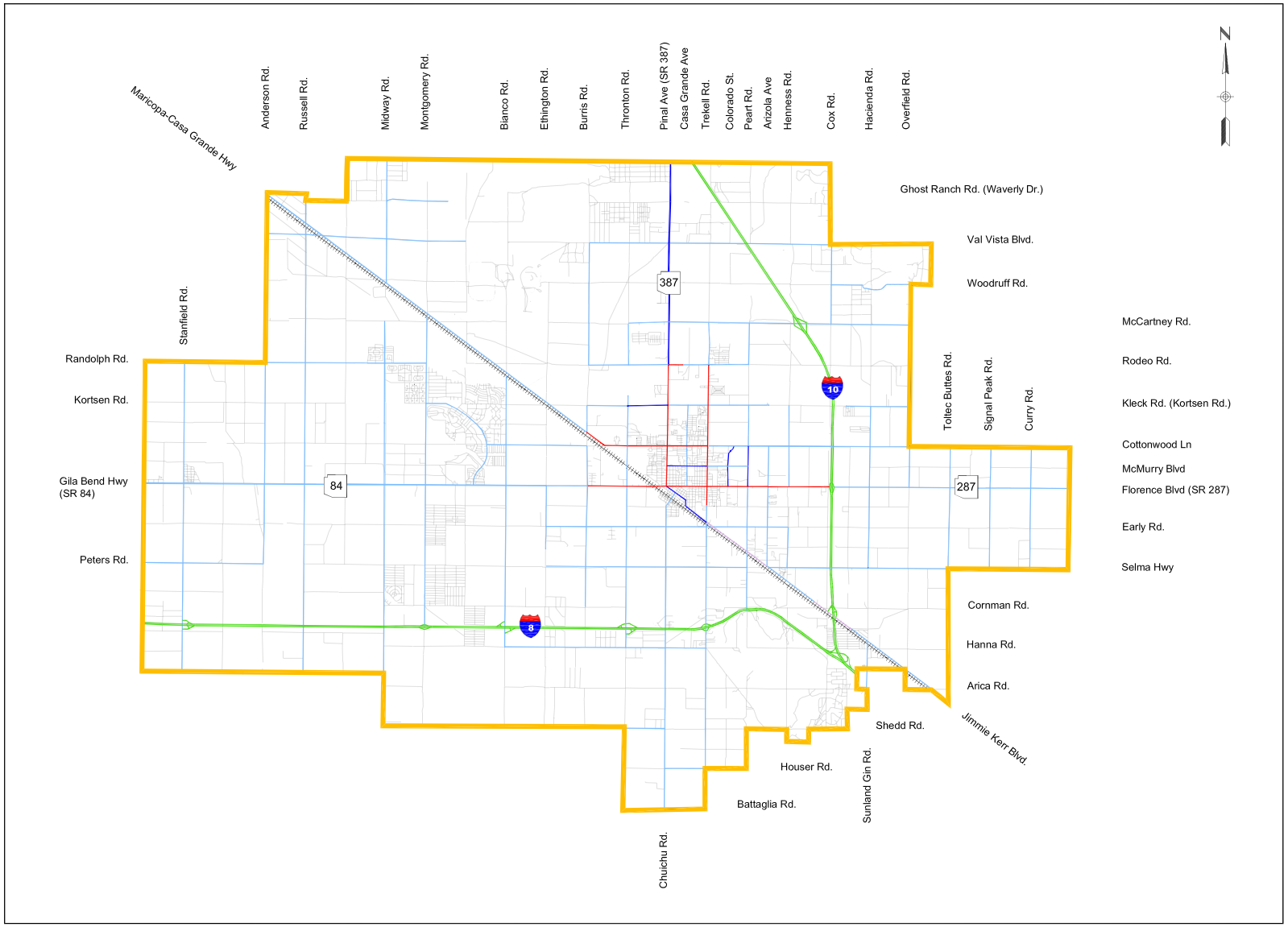


FIGURE 4-3

2005 Casa Grande Small Area Transportation Study

SPEED LIMITS AND LOCATION OF TRAFFIC SIGNALS

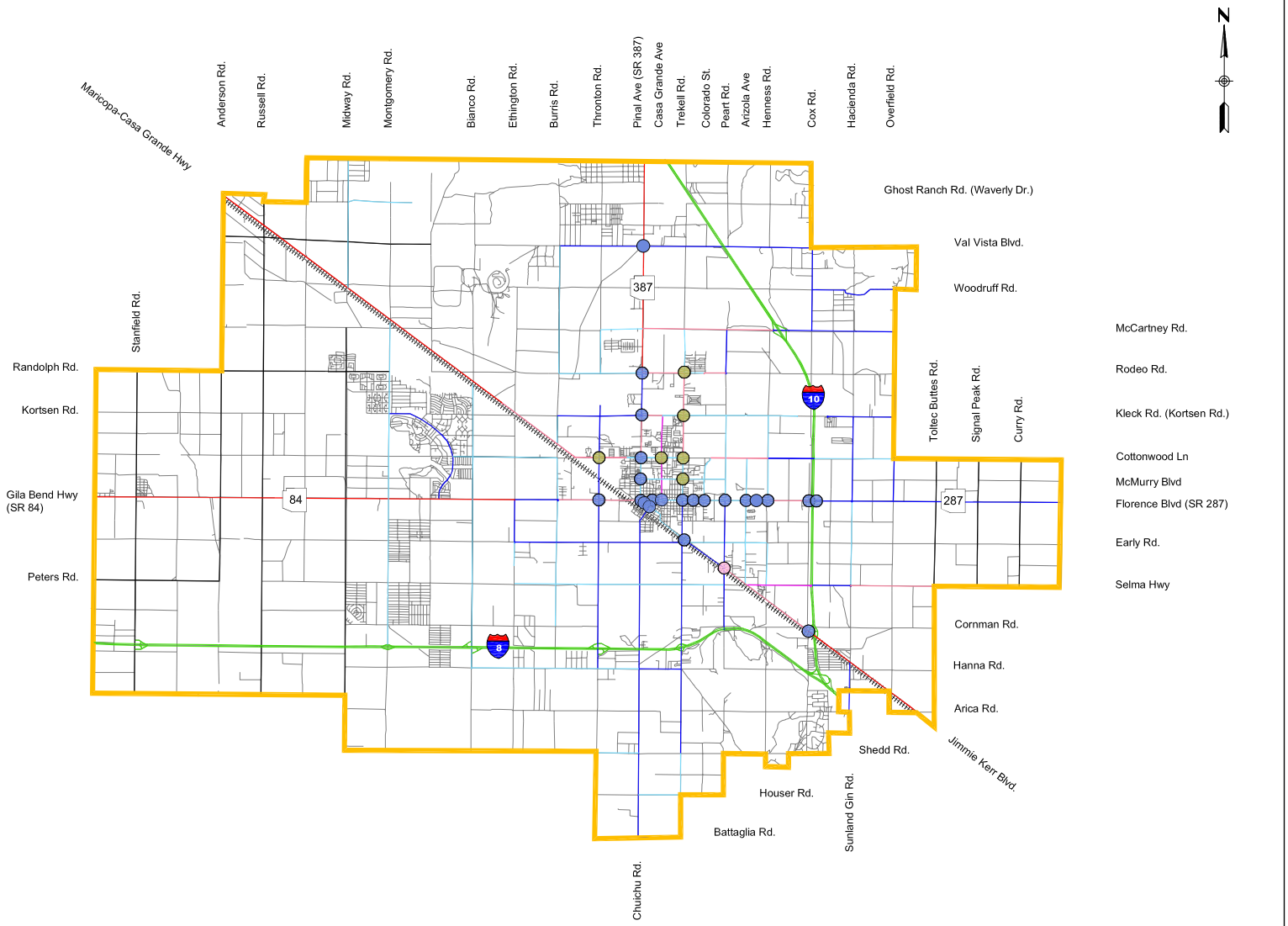


FIGURE 4-4

2005 Casa Grande Small Area Transportation Study

SURFACE TYPE

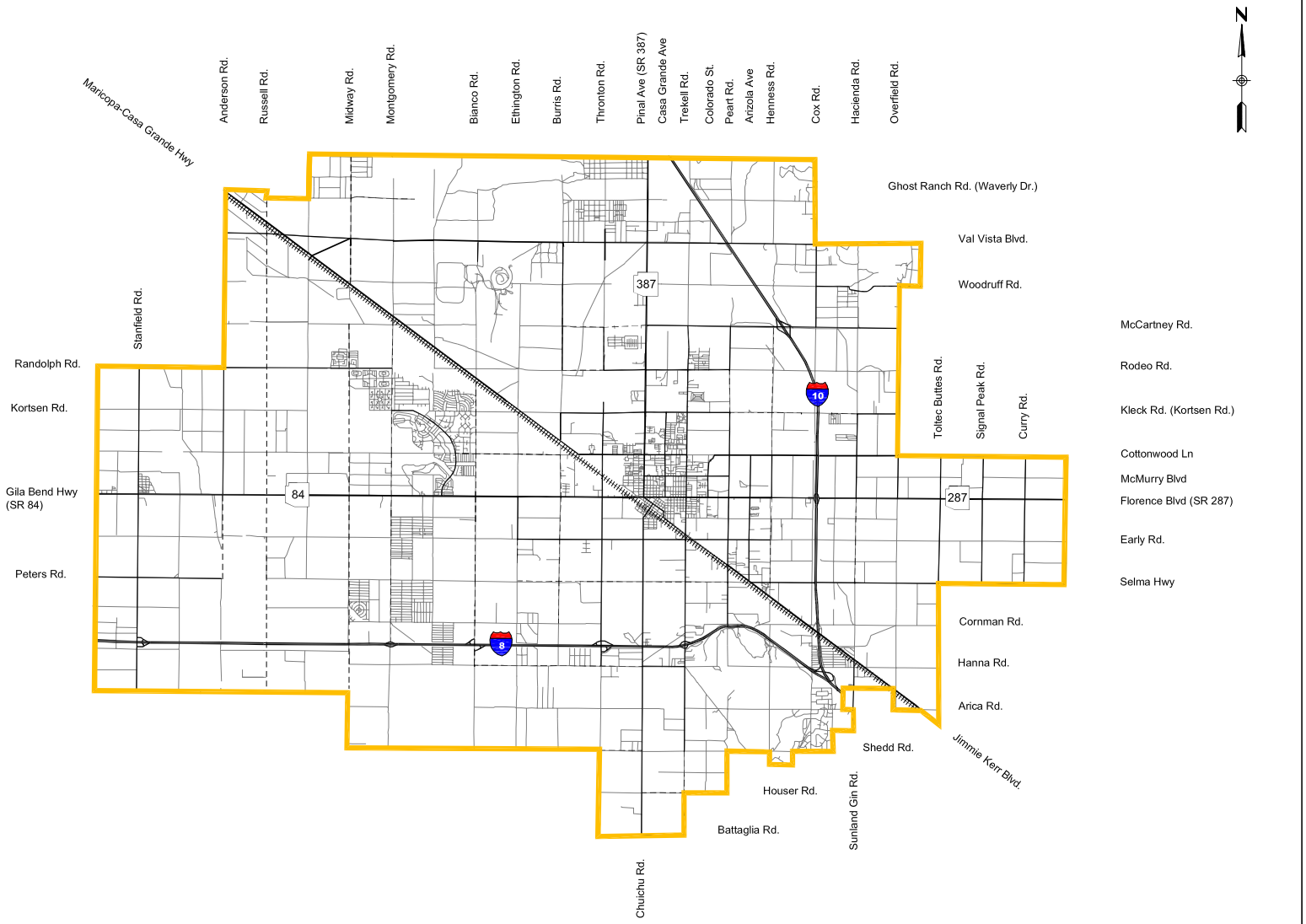


FIGURE 4-5

2005 Casa Grande Small Area Transportation Study

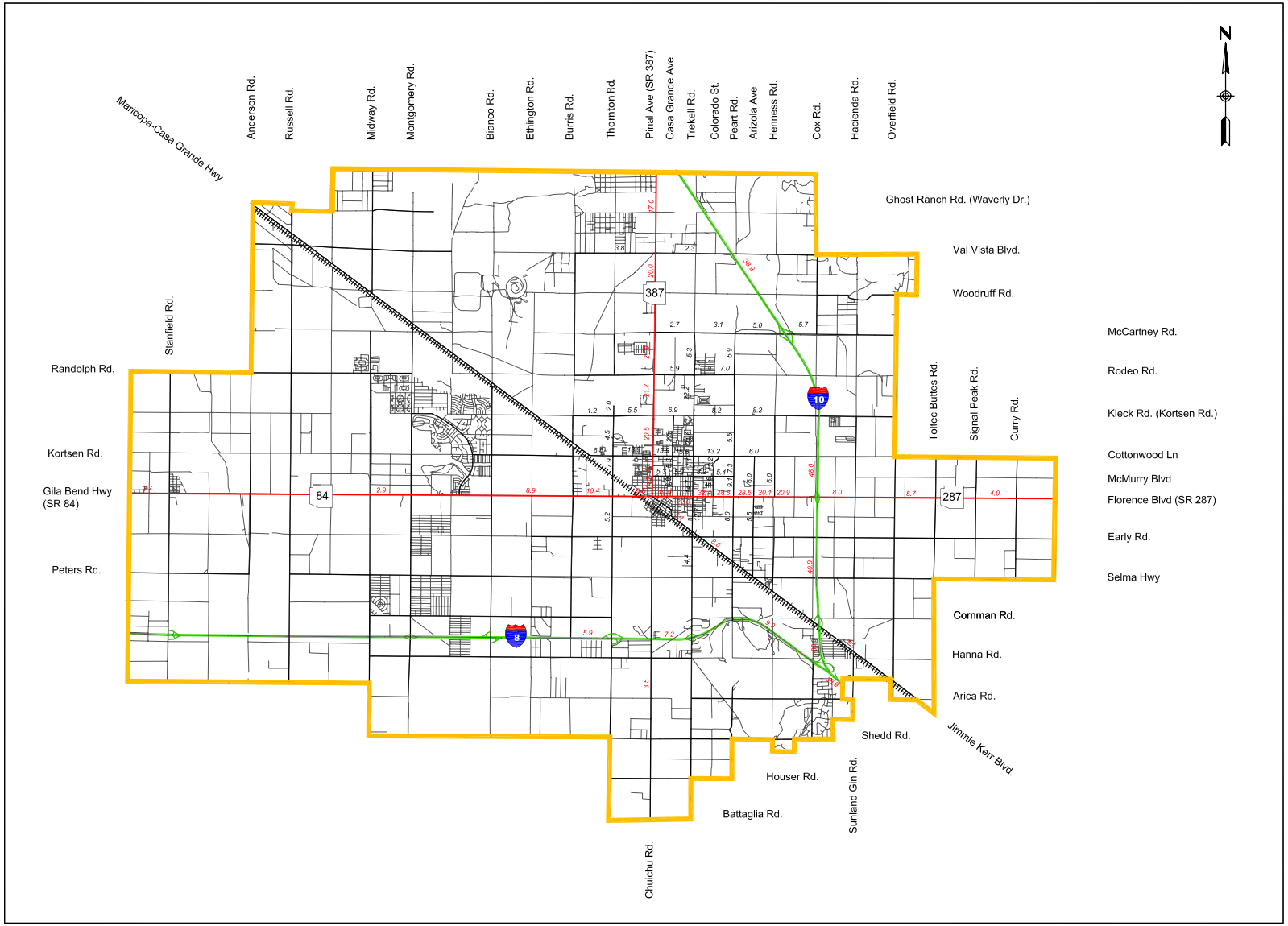
4.3.5 TRAFFIC COUNTS

The year 2005 traffic volumes are shown in Figure 4-6. Table 4-4 shows historical growth trends for key roadways in the study area. The overall average annual growth rate on the selected facilities for the four-year period between 2002 and 2005 is seven percent, ranging from a high of 30.2 percent on Korsten Road to a low of 0.1 percent on I-10. Figure 4-7, 2005 Network Performance, shows that all study area facilities were operating at acceptable levels of service in year 2005.

TABLE 4-4
HISTORICAL DAILY TRAFFIC COUNTS FOR SELECTED FACILITIES

Facility	Location	2002	2003	2004	2005	Annual Growth Rate
Korsten Road	E of Thornton Road	4,516	4,246	5,686	5,453	5.2%
SR 84 (Gila Bend Hwy)	E of Thornton Road	11,629	10,849	12,537	12,550	2.0%
Pinal Avenue	N of Val Vista Boulevard	13,744	15,424	17,104	16,978	5.9%
Pinal Avenue	S of Kortsen Road	18,941	17,621	20,195	20,586	2.2%
Trekell Road	N of Cottonwood Lane	18,736	18,059	20,381	21,629	3.9%
McCartney Road	E of Trekell Road	2,752	2,851	2,993	3,084	3.0%
Rodeo Road	E of Trekell Road	5,081	4,736	5,626	7,012	9.5%
Kortsen Road	E of Trekell Road	3,711	4,444	3,950	8,200	30.2%
Cottonwood Lane	E of Trekell Road	7,947	11,165	20,239	13,208	16.6%
Florence Boulevard	W of Peart Road	22,946	21,873	29,672	28,809	6.4%
I-10	S of SR 387	38,700	40,400	38,900	38,900	0.1%
I-10	S of McCartney Road	35,200	44,600	48,000	46,900	8.3%
I-10	S of SR 287/ Florence Boulevard	36,800	42,200	40,900	38,700	1.3%

Source: City of Casa Grande Public Works Department, 2005; Arizona Department of Transportation, 2005



EXISTING YEAR
2005 DAILY
TRAFFIC VOLUMES
(IN THOUSANDS)

X.X Average Daily 2005 Traffic Volumes - (in thousands)

Study Area

FIGURE 4-6

2005 Casa Grande Small Area Transportation Study

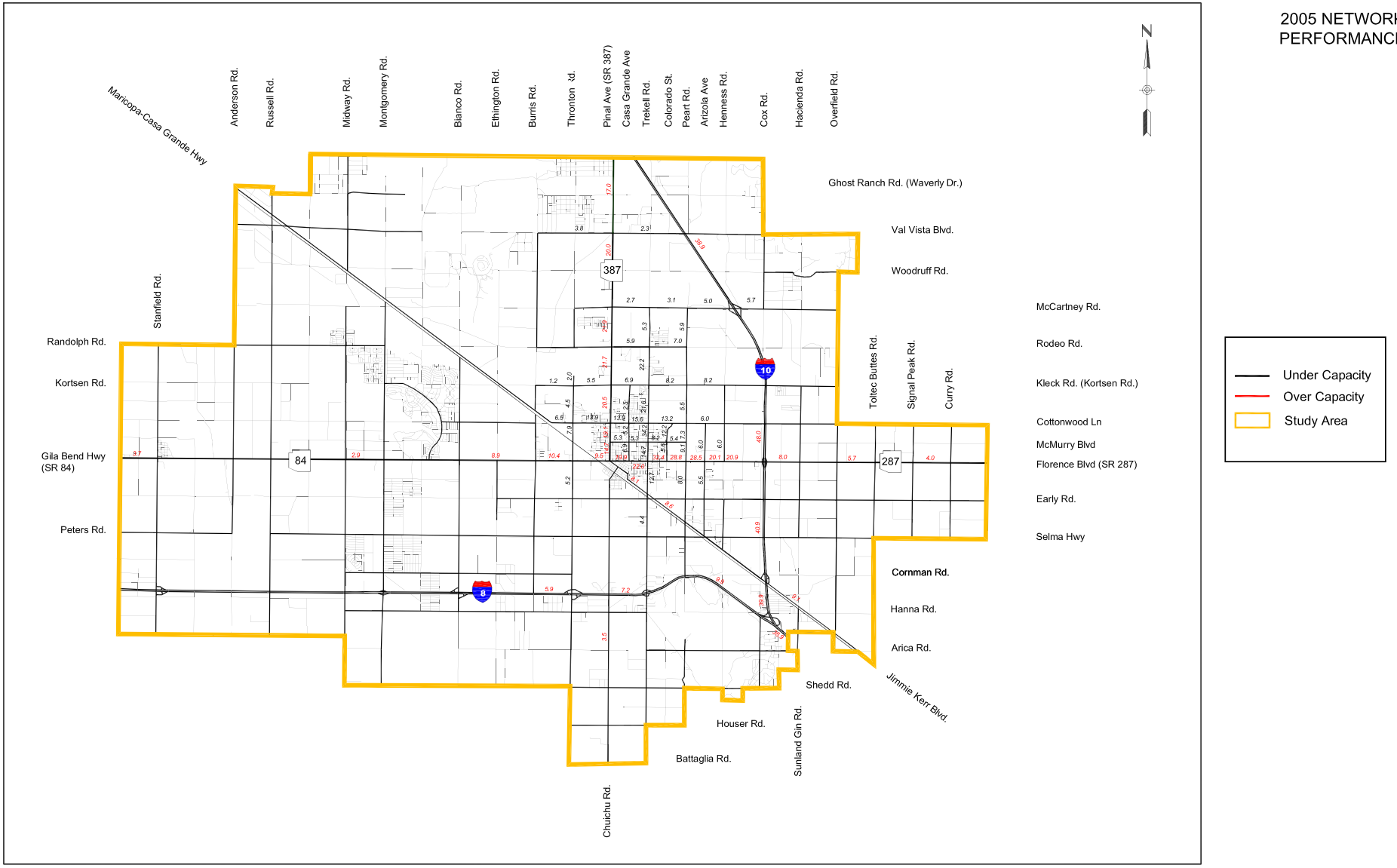


FIGURE 4-7

2005 Casa Grande Small Area Transportation Study

4.4 SAFETY AND CRASH HISTORY

Crash data was collected from the Arizona Department of Transportation (ADOT) and the City of Casa Grande for key roadways for the years 2002 to 2004. The project team reviewed safety conditions on the following key study area arterial facilities:

- Cottonwood Lane
- Florence Boulevard
- Henness Road
- Kortsen Road
- McCartney Road
- Peart Road
- Pinal Avenue (SR 387)
- Rodeo Road
- SR 84
- Trekell Road
- Val Vista Road

The purpose of this review was to identify safety trends on the roadway network. Further, for locations where high crash frequency is identified, possible treatments are presented for both ADOT and the City of Casa Grande to consider as they develop their Transportation Improvement Programs (TIP).

As the crash histories were assembled, the data from both the City and ADOT were compared to ensure that duplicate incidents were not recorded. The data obtained included information about accident date, time, location, and severity. Table 4-5 shows crash rates by year for the key study area facilities for 2002 to 2004. Table 4-6 shows average crash severity between January 1, 2002 and December 31, 2005. Table 4-7 shows the number of crashes that occurred at key intersections. Table 4-8 shows crashes on study area facilities by peak month.

TABLE 4-5
KEY STUDY AREA FACILITY CRASH RATE SUMMARY – 2002 TO 2004

Facility	From	To	2002(1)	2003(1)	2004(1)	Average Segment Crash Rate(2)
Cottonwood Lane	I-10	Thornton Road	5.17	4.81	3.22	4.40
Florence Boulevard (SR 287)	Center Avenue	Overfield Road	5.33	7.18	5.63	6.05
Henness Road	Cottonwood Lane	Early Road	0.90	0.41	0.59	0.63
Kortsen Road	I-10	Trekell Road	2.37	2.05	1.97	2.13
McCartney Road	I-10	Pinal Avenue (SR 387)	1.03	0.27	0.45	0.58
Peart Road	Early Road	McCartney Road	2.07	2.23	1.84	2.05
Pinal Avenue (SR 387)	Florence Boulevard	I-10	2.09	2.17	2.61	2.29
Rodeo Road	I-10	Trekell Road	1.75	1.48	2.01	1.75
Gila Bend Hwy (SR 84)*	Thornton Road	Pinal Avenue (SR 387)	3.56	6.06	6.24	5.28
Trekell Road	Early Road	McCartney Road	3.17	3.39	3.64	3.40
Val Vista Road	I-10	Pinal Avenue (SR 387)	0.27	0.53	3.73	1.51

Note: (1) Segment crash rate per million vehicle miles of travel.

(2) Three-year (2002-2004) average segment crash rate per million vehicle miles of travel.

* ADOT AADT data between 2002 and 2003 shows a large discrepancy, data may be compromised.

Sources: Arizona Department of Transportation, 2005; City of Casa Grande Police Department, 2005; Stantec, 2005

TABLE 4-6
KEY STUDY AREA FACILITY AVERAGE CRASH SEVERITY – 2002 TO 2004

Facility	From	To	2002 to 2004 Average Crash Severity			
			Property Damage Only	Possible Injury	Injury	Fatality
Cottonwood Lane	I-10	Thornton Road	5.0%	67.0%	28.0%	0.1%
Florence Boulevard (SR 287)	Center Avenue	Overfield Road	19.0%	61.0%	20.0%	0.1%
Henness Road	Cottonwood Lane	Early Road	0.0%	50.0%	50.0%	0.0%
Kortsen Road	I-10	Trekell Road	0.0%	55.0%	43.0%	2.0%
McCartney Road	I-10	Pinal Avenue (SR 387)	0.0%	54.0%	46.0%	0.0%
Peart Road	Early Road	McCartney Road	0.5%	60.0%	39.0%	0.1%
Pinal Avenue (SR 387)	Florence Boulevard	I-10	6.0%	62.0%	32.0%	0.1%
Rodeo Road	I-10	Trekell Road	2.0%	58.0%	40.0%	0.0%
Gila Bend Highway (SR 84)	Thornton Road	Pinal Avenue (SR 387)	4.0%	69.0%	25.0%	2.0%
Trekell Road	Early Road	McCartney Road	5.0%	65.0%	29.0%	1.0%
Val Vista Road	I-10	Pinal Avenue (SR 387)	0.0%	59.0%	41.0%	0.0%

Sources: Arizona Department of Transportation, 2005; City of Casa Grande Police Department, 2005; Stantec, 2005

TABLE 4-7
CRASHES AT KEY STUDY AREA INTERSECTIONS – 2002 TO 2004

Facility	Intersection	Control Type	Crashes[1]
Cottonwood Lane	Pinal Avenue (SR 387)	Signal	73
	Trekell Road	Signal	56
	Peart Road	Stop Sign	34
	Amarillo Road	Stop Sign	13
Florence Boulevard (SR 287)	Trekell Road	Signal	97
	Colorado Road	Signal	86
	Pueblo Road	Signal	72
Henness Road	Cottonwood Lane	Stop Sign	4
	Florence Boulevard (SR 287)	Stop Sign	4
	Early Road	Stop Sign	1
Kortsen Road	Trekell Road	Signal	38
	Pinal Avenue (SR 387)	Signal	36
	Thornton Road	Stop Sign	8
McCartney Road	Trekell Road	Stop Sign	14
	Peart Road	Stop Sign	8
	Pinal Avenue (SR 387)	Stop Sign	4
Peart Road	Florence Boulevard (SR 287)	Signal	55
	Cottonwood Lane	Stop Sign	34
	McMurray Boulevard	Stop Sign	20
Pinal Avenue (SR 387)	Cottonwood Lane	Signal	60
	Rodeo Road	Signal	33
	Kortsen Road	Signal	31
	Florence Boulevard (SR 287)	Signal	28
	McMurray Boulevard	Signal	22
Rodeo Road	Pinal Avenue (SR 387)	Signal	34
	Trekell Road	Signal	17
	Peart Road	Stop Sign	6
Gila Bend Highway (SR 84)	Thornton Road	Signal	9
Trekell Road	Florence Boulevard (SR 287)	Signal	97
	Cottonwood Lane	Signal	56
	Kortsen Road	Signal	38
	McMurray Boulevard	Stop Sign	32
	Rodeo Road	Signal	17
Val Vista Road	Pinal Avenue (SR 387)	Stop Sign	16
	Trekell Road	Stop Sign	1

Note: (1) Includes crashes reported to have occurred at key intersections. This total does not include mid-block accidents.
Sources: Arizona Department of Transportation,2005; City of Casa Grande Police Department, 2005; Stantec, 2005

TABLE 4-8
KEY STUDY AREA FACILITY CRASHES BY HIGHEST AND LOWEST MONTH – 2002 TO 2004

Facility	Highest		Lowest	
	Month	Crashes	Month	Crashes
Cottonwood Lane	November	31	July	10
	February	30		
	August	29		
	September	29		
Florence Boulevard (SR 287)	December	100	June	67
	November	97		
	February	90		
	March	90		
Henness Road	No Apparent Trend	NA	No Apparent Trend	NA
Kortsen Road	June	15	August	5
	February	11		
	January	10		
	April	10		
McCartney Road	February	5	Several months, each showing one incident tied for the lowest number of crashes.	NA
	March	4		
Peart Road	March	15	June	6
	May	15		
	February	14		
	November	14		
Pinal Avenue (SR 387)	February	49	July	18
	March	40		
Rodeo Road	February	12	December	2
	May	9		
	October	8		
Gila Bend Highway (SR 84)	July	14	September	2
	October	9		
	November	8		
Trekell Road	November	58	July	23
	February	49		
	January	42		
	December	39		
Val Vista Road	November	4	Several months, each showing one incident tied for the lowest number of crashes.	NA

Sources: Arizona Department of Transportation,2005; City of Casa Grande Police Department, 2005; Stantec, 2005

4.4.1 SAFETY TRENDS

Annual crash rates are a key indicator of safety trends on a specific facility. These rates show the annual number of crashes for each 1 million vehicle miles traveled over a given roadway segment. This crash analysis shows that safety trends vary by facility. While recent data on the type of crashes was not available, the data does show that most accidents occur at intersections. The data also shows that most crashes occur in the higher traffic months of November, December, February, and March. A breakdown of the crash analysis by roadway facility is presented below.

Cottonwood Lane
In 2002, the crash rate was 5.17 per million vehicle miles of travel. In 2004, the rate had decreased to 3.22. The crash analysis shows that most accidents are occurring at or near an intersection.

Florence Boulevard
The analysis shows a small increase in the crash rate on Florence Boulevard between 2002 and 2004. Most of the crashes on this facility are intersection related.

Henness Road
From the intersection analysis, 90% of the accidents occurred at an intersection.

Kortsen Road
The 2002 crash rate was 2.37 per million vehicle miles of travel; in 2004 it was 1.97.

McCartney Road
In 2002, there were a total of 15 crashes, and in 2004 there were 7 crashes. The installation of nearby traffic control devices may have contributed to the decrease.

Peart Road
Over the three-year period between 2002 and 2004, there was one crash in the mile spanning from Early Road to Florence Boulevard, 78 crashes from Florence Boulevard to Cottonwood Lane, 40 crashes from Cottonwood Lane to Kortsen Road, and the remaining 8 crashes occurred over the remaining two-mile stretch.

Pinal Avenue
The analysis shows an increase in the crash rate in the three year period between 2002 and 2004 on Pinal Avenue. Between 2002 and 2004, there were 192 crashes in the first mile of the roadway spanning from SR-84 to Cottonwood Lane, 62 crashes from Cottonwood Lane to Kortsen Road, 50 crashes from Kortsen Road to Rodeo Road, and the rest of the 84 crashes occurred over the remaining 5.5 miles. One intersection of particular note is SR 387 and Val Vista Boulevard. In both 2002 and 2003, this intersection had only one crash. However, in 2004 the number of crashes increased to 15.

Rodeo Road
The analysis shows an increase in the crash rate in the three year period between 2002 and 2004 on Rodeo Road. In 2002 there were 1.75 crashes per million vehicle miles of travel. In 2004 there were 2.01.

SR 84
The crash rate on SR 84 almost doubled between 2002 and 2004. In 2002, the crash rate was 3.56 per million vehicle miles of travel. In 2004 that rate increased to 6.24.

Trekell Road
The analysis shows an increase in the crash rate in the three year period between 2002 and 2004 on Trekell Road. In 2002 there were 3.17 crashes per million vehicle miles of travel. In 2004 there were 3.64.

Val Vista Road
Val Vista Road showed a dramatic increase in the crash rate between 2002 and 2004. In 2002 the crash rate was 0.27 per million vehicle miles of travel. In 2004 that rate increased to 3.73.

4.4.2 CRASH REDUCTION EFFORTS

In addition to the crash summary above, ADOT has been monitoring crashes along their two primary surface arterials in Casa Grande, namely Pinal Avenue (SR-387) and Florence Boulevard (SR-287). The Tucson District prepared two studies in 2003 to better address the crashes along these roadways. Both studies concluded that better access management along Pinal Avenue and Florence Boulevard would improve safety and improve traffic flow along these routes, particularly within the more urbanized sections. Key recommendations from these studies include:

- Construct raised concrete median to restrict excess turning movements and alleviate high crash frequency; and,
- Improve sidewalk access, pedestrian crosswalks, and reduce driveway access.

To address access management issues on a statewide basis, ADOT is nearing the completion of a study to develop a Statewide Access Management Plan. When complete, this plan will contain specific access management strategies and recommendations for all state facilities based on the roadways functional classification.

4.4.3 SUMMARY

Although the depth of the safety and crash data for this Small Area Transportation Study does not include the level of detail shown in the ADOT studies, many of the same trends are evident. Therefore, to improve safety within the Casa Grande City planning area, Table 4-9 outlines the most frequent types of accidents, their probable cause and possible treatment. As further crash analysis occurs, Table 4-9 may assist transportation safety officials in identifying the types of treatments that may be implemented to decrease accidents and improve traffic flow.

TABLE 4-9
ACCIDENT COUNTERMEASURES

Accident Type	Possible Cause	Possible Strategies
Right Angle Accidents at Unsignalized Intersections	Ignoring traffic control devices. Improper judgment of gap size. Large total intersection volume. High approach speed. Restricted sight distance.	• Retime adjacent signals to create gaps at stop-controlled intersections. • Provide targeted enforcement to control speed and stop sign violations. • Provide traffic calming on intersections approaches through a combination of geometrics and traffic control devices, such as install raised median and eliminate two-way left turn lane. • Remove sight obstructions. • Install/improve street lighting. • Install signal based upon Manual on Uniform Traffic Control Device (MUTCD) warrants. • Reduce speed limit on approaches if justified by speed study.
Rear-End Accident at Unsignalized Intersections	Pedestrian crossing. Driver not aware of intersection. Slippery surface. Large numbers of turning vehicles. Excessive speed. Follow too close.	• Provide right-turn acceleration lanes at intersections. • Provide full-width paved shoulders in intersection areas. • Clear sight triangles on stop- or yield-controlled approaches to intersections. • Provide targeted speed enforcement. • Provide traffic calming on intersection approaches through a combination of geometrics and traffic control devices, such as install raised median and eliminate two-way left turn lane. • Install/Improve signing and/or marking for pedestrian facilities. • Increase curb radii. • Create left- or right-turn lanes.
Run-Off-Road	Slippery pavement/ponded water. Roadway design inadequate for traffic conditions. Poor delineation. Poor visibility. Improper channelization.	• Conduct speed control study. • Provide adequate drainage. • Overlay existing pavement. • Install/improve traffic barriers. • Flatten slopes and ditches. • Improve alignment/grade. • Provide proper super elevation • Widen lanes and shoulders. • Improve/install pavement markings. • Increase sign size. • Improve roadway lighting. • Improve channelization.

Accident Type	Possible Cause	Possible Strategies
Sideswipe or Head-On	Inadequate road design and/or maintenance. Inadequate shoulders. Excessive vehicle speed. Inadequate pavement markings. Inadequate channelization. Inadequate signing.	• Perform necessary road surface repairs. • Sign and mark unsafe passing areas. • Improve alignment/grade. • Provide wider lanes. • Provide passing lanes. • Improve shoulders. • Reduce speed limit if justified by speed study. • Install raised median. • Install reflectorized pavement markers. • Install/improve channelization. • Install acceleration and deceleration lanes. • Provide turning bays. • Provide advance direction and warning signs.
Right-angle collisions at signalized intersections	Poor visibility of signals Inadequate signal timing	• Install advanced warning devices (see MUTCD). • Install sun visors on traffic signals. • Install back plates. • Reduce speed limit on approaches if justified by spot speed study. • Remove sight obstructions. • Adjust amber phase. • Provide all-red clearance phases. • Coordinate signals.
Collision at driveways	Left-turning vehicles Improperly located driveway Right-turning vehicles Large volume of through traffic Large volume of driveway traffic Restricted sight distance	• Install left turn lanes as appropriate. • Install raised median on roadway to prevent left turning vehicles. • Install two-way left-turn lanes. • Regulate minimum spacing of driveways (access management). • Regulate minimum corner clearance • Install curbing to define driveway location where appropriate. • Consolidate adjacent driveways • Implement shared driveway philosophy. • Restrict parking near driveways • Increase the width of driveways • Increase curb radii • Provide right-turn lanes • Widen through lanes • Move driveway to side street • Construct a local service road • Provide acceleration and deceleration lanes • Channelize driveway • Reduce speed limit if justified by spot speed study • Install/improve street lighting • Remove sight obstructions

Sources: *Traffic Engineering Handbook,* Institute of Transportation Engineers, Washington D.C., 1999, Table 7-14. Transportation Research Board.*NCHRP Report 500 – Guidance for Implementation of the AASHTO Strategic Highway Safety Plan, Volume 5: A Guide for Addressing Unsignalized Intersection Collisions, Washington D.C., 2003.*

4.5 TRUCK TRAFFIC

The surface freight system within the City of Casa Grande's planning boundary includes interstates, selected state routes and local routes. Local truck routes are an important part of the freight system, and thus an important part of the local economy. In fact, "the total resource costs of urban goods movement are comparable to those of urban person movement … In other words, about half of total urban transportation costs, in economic terms, are related to freight."[1] "Passengers going to shop, going to work, coming from work, going to a restaurant for lunch or dinner, going to a movie, or just going for a drive are indeed making freight-related trips. If the trucks from the food and department store warehouses, from suppliers to manufactures, from restaurant and entertainment supply houses, and from highway paving and construction companies had not made their trips, passengers would not be making theirs."[2] Therefore, nearly all of the vehicle movements in growing urban areas, like Casa Grande, are tied both directly and indirectly to truck movements.

Vehicle classification count data used to quantify heavy vehicle traffic is only available on state facilities. City staff and residents have, however, observed significant volumes of heavy vehicles using Cottonwood Lane, Thornton Road, and Kortsen Road for access to I-10 and Phoenix. Table 4-10 summarizes the heavy vehicle volumes on the state roadways within the Casa Grande study area. The Federal Highway Administration (FHWA) classifies vehicles by size and number of wheels. Vehicles larger than a pick-up truck with more than four wheels are generally considered heavy vehicles.

TABLE 4-10
YEAR 2004 DAILY TRUCK VOLUMES

Roadway	Segment	Average Daily Traffic	Heavy Vehicle Volume(1)	Percent Heavy Vehicles
I-8	Stanfield to I-10	7,660	3,064	40
I-10	SR 387 to I-8	41,920	15,510	37
SR-84 (Gila Bend Highway)	Stanfield to I-10	7,080	1,062	15
SR-287 (Florence Boulevard)	SR 84 & SR 387 Interchange to SR 87	18,700	2,805	15
SR-387 (Pinal Avenue)	SR 84 & SR 287 Interchange to SR 87	16,500	1,815	11

Source: Arizona Department of Transportation, 2004

Note: FHWA vehicle class group 4 or higher. This includes vehicles larger than a pick-up truck with more than four wheels.

Within the Casa Grande study area, the highest truck volumes are found on the interstate system. Truck volumes along I-8 from Stanfield Road (milepost 161.53) to the I-10 interchange (milepost 178.33) account for 40% of total traffic on I-8. On I-10, truck traffic from the SR 387 interchange (milepost 185.26) to the I-8 interchange (milepost 199.08) accounts for 37% of total traffic.

[1] Ogden, Kenneth Wade, "Urban Goods Movement and Its Relation to Planning" in *Proceedings of the Urban Goods and Freight Forecasting Conference* (Washington, D.C.: FHWA and TMIP, forthcoming, 1998, 2-1 to 2-14).
[2] Capelle, Russell B., "Commodity Flows and Freight Transportation" in Chapter 3 of the Institute of Transportation Engineers *Transportation Planning Handbook*, 2nd Edition (Washington, D.C.: Institute of Transportation Engineers, 1999) pg. 25.

Three state routes intersect the study area, SR 84 (Gila Bend Highway), SR 287 (Florence Boulevard), and SR 387 (Pinal Avenue). The selected state routes are utilized by local trucking industries as a connection between local routes and the interstate system.

SR 84 and SR 287 along with I-8 serve as major east/west routes for trucks, while SR 387 and I-10 serve as north/south routes. The truck volumes along SR 84 from Stanfield Road (milepost 165.92) to the I-10 interchange (milepost 196.08) account for 15% of total traffic. Along SR 287 from the SR 84-SR 387 interchange (milepost 111.72) to Central Avenue (Milepost 117.78) trucks account for 15% of traffic. From Central Avenue (milepost 117.78) to the SR 87 interchange (milepost 125.81) trucks account for 11% of total traffic. On SR 387 from the SR 84-SR 287 interchange (milepost 0) to the SR 87 interchange (milepost 15.72), trucks account for an average of 11% of total traffic.

4.6 MULTI-MODAL TRANSPORTATION

4.6.1 TRANSIT

Existing public transportation is provided by taxicab companies and by various public and private agencies that offer special transportation services. Taxi service is provided in the Casa Grande Valley as well as to Sky Harbor International Airport in Phoenix. No demand responsive transit service other than taxis is currently provided. Deviated fixed route public transit service is provided by Community Transportation on four separate routes linking Casa Grande and other municipalities in the region. Community Transportation is operated by Pinal Gila Community Child Services, Inc., and funded by the JOBS division of the Arizona Department of Economic Security. Greyhound bus service connects the City of Casa Grande with Phoenix, Tucson, and other major metropolitan areas.

In addition to the transit service provided by Pinal Gila Community Child Services, Inc., Casa Grande is also participating in the Pinal Rides transportation coordination pilot project. This human services transit project is coordinated by the Pinal-Gila Council for Senior Citizens. This agency provides elderly and disabled with transportation along routes between Florence, Coolidge and Casa Grande and Eloy and Casa Grande. The Pinal Rides demonstration project is part of the Arizona Rides initiative undertaken by the Governor's Office in coordination with ADOT and other state agencies in 2005.

4.6.2 NON-MOTORIZED MODES

The current system of pedestrian and bicycle facilities is discontinuous and incomplete. However, the City has been incrementally developing a pedestrian/bicycle trail system. Bicycle lanes have been incorporated into the construction of new arterials and collector streets. The City's Roadway Design standards include bike lanes for both arterial and collector streets. In addition, the City has also implemented multi-use paths along canals and washes.

4.7 PROGRAMMED AND PLANNED ROADWAY IMPROVEMENTS

As the City of Casa Grande increases in size and planning area, the roadway network is also growing to meet the additional travel demands. Due to the high concentration of traffic around the City's downtown area, a number of street improvements are required. The convergence of I-10 and I-8, as well as the

adjacency of Casa Grande with the neighboring communities of Eloy and Coolidge, creates demand for additional capacity on arterial and collector roadways. Table 4-11 shows currently planned improvements to the City of Casa Grande roadway network:

TABLE 4-11
CITY OF CASA GRANDE PLANNED ROADWAY IMPROVEMENTS

Facility	From	To	Start	End	Current Lanes	Improved Lanes	Description
Doan Street	Trekell Road	Pottebaum Avenue	3/6/07	9/11/08	0	2	New Road
Hacienda Road	Selma Highway	Jimmie Kerr Boulevard	3/2/06	9/8/07	0	2	New Road
Kortsen Road	Peart Road	Hacienda Road	3/1/08	9/2/09	0	2	New Road
Rodeo Road	Casa Grande Avenue	Trekell Road	12/1/04	10/29/06	2	5	Rehab / Widen
Trekell Road	Rodeo Road	McCartney Road	3/2/06	9/1/07	2	5	Rehab / Widen
Thornton Road	SR 84	Cottonwood Lane	3/2/06	9/8/07	2	5	Rehab / Widen
McCartney Road	Peart Road	I-10	3/1/08	9/2/09	2	5	Rehab / Widen
Cottonwood Lane	Amarillo Street	Peart Road	3/1/08	9/2/09	2	4	Rehab / Widen
Thornton Road	SR 84	Peters Road	3/1/08	9/6/09	2	5	Rehab / Widen
McCartney Road	Peart Road	Pinal Avenue	3/2/10	9/3/11	2	5	Rehab / Widen

Source: City of Casa Grande, 2005

4.8 TRAVEL DEMAND MODEL DEVELOPMENT

The travel demand model used for this study is an update of the TransCAD travel demand forecasting model used for the previous 2001 Casa Grande Multimodal Transportation Study. The model network was expanded to cover the current Casa Grande planning area and updated with year 2005 socioeconomic data and traffic count data.

4.8.1 MODEL VALIDATION

Model validation is the adjustment of model parameters through an iterative process until reasonable agreement is reached between the model-simulated traffic volumes and actual traffic counts. The Federal Highway Administration's (FWHA) *Travel Model Validation and Reasonableness Checking Manual*, Feburary 1997, provides several measures to evaluate model performance compared to observed traffic counts. The measure used for the City of Casa Grande travel demand model validation effort compared total year 2005 model volume estimates to total year 2005 traffic counts across screenlines. A screenline is an imaginary line across which traffic flows can be summed. Screenline analysis allows for ready evaluation of travel trends and model performance.

The FHWA manual states that the maximum desirable deviation for total screenline volumes should be 20 percent. Three north-south and two east-west screenlines through the Casa Grande core were used for model validation. With the total screenline volume average deviation for the year 2005 Casa Grande model validation at 2 percent, the model was judged to be acceptable for forecasting future traffic with a high degree of confidence. Figure 4-8 illustrates the model network and the five screenlines used to validate model generated traffic flows.

4.8.2 TRIP GENERATION

Table 4-12 shows the vehicle trip generation characteristics used in the travel demand model. These quick response trip generation rates are based on the *Institute of Transportation Engineers Trip Generation, 7th Edition,* 2002.

TABLE 4-12
VEHICLE TRIP GENERATION CHARACTERISTICS

Land Use Category	Socioeconomic Variable	Average Daily Vehicle Trips per Unit
Residential	Dwelling Units	13.5
Retail	Employee	22.0
Office	Employee	12.0
General	Employee	5.0

Source: Casa Grande Multimodal Transportation Study, Lima & Associates, 2001.

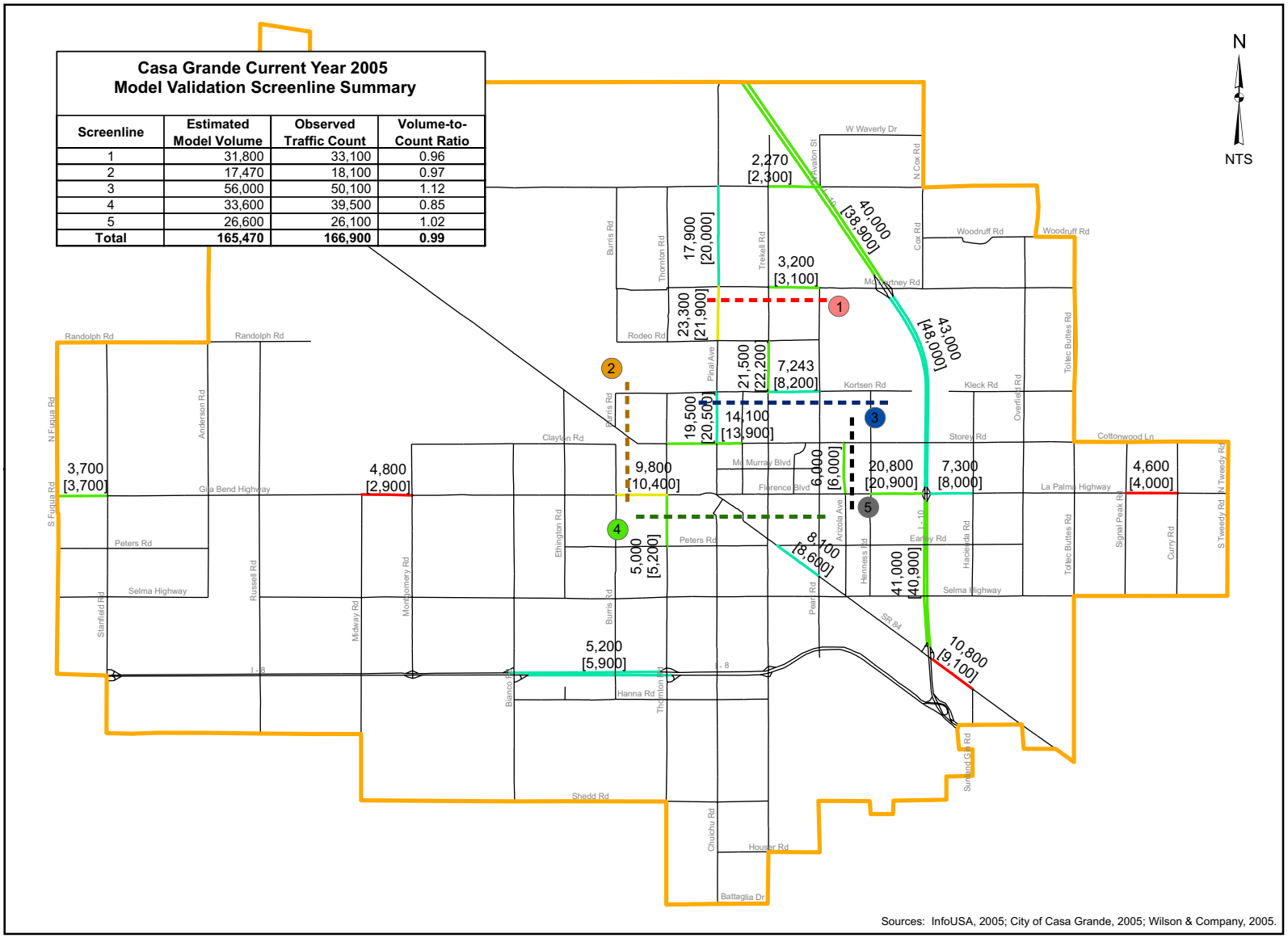
4.8.3 EXTERNAL TRIPS

External trips are trips with one or more trip ends outside the study area. There are primarily two types of external trips. The first are external-internal, internal-external trips. These are regional trips with one trip end inside the study area and the other outside the study area. This would include travel between the cities of Maricopa and Casa Grande, for example. The other type of external trips does not stop within the study area, such as an interstate trip between Phoenix and Tucson, for example. Updated external trip estimates were based upon traffic counts at study area cordon crossings at the exterior boundaries of the planning area. Table 4-13 shows the year 2005 external trip estimates used in the model validation.

YEAR 2005 MODEL VALIDATION SUMMARY

Casa Grande Current Year 2005 Model Validation Screenline Summary

Screenline	Estimated Model Volume	Observed Traffic Count	Volume-to-Count Ratio
1	31,800	33,100	0.96
2	17,470	18,100	0.97
3	56,000	50,100	1.12
4	33,600	39,500	0.85
5	26,600	26,100	1.02
Total	**165,470**	**166,900**	**0.99**



Sources: InfoUSA, 2005; City of Casa Grande, 2005; Wilson & Company, 2005.

Ratio of Model Volume Estimates to Observed Traffic Counts

(Daily Traffic Volumes)

- 0.86 - 0.95
- 0.96 - 1.05
- 1.06 - 1.15
- 1.15+

Base Map Features

- Model Volume [Traffic Count]
- Arterials
- StudyArea
- Screenline Location
- 1 Screenline Reference Number

FIGURE 4-8

TABLE 4-13
YEAR 2005 CASA GRANDE EXTERNAL TRIPS

Location	2005 Traffic Count	Portion External-External	External-External Vehicles	Internal-External Vehicles
I-10 S of SR 387	40,000	82%	32,600	7,400
Pinal Ave S of I-10	11,800	15%	1,770	10,030
Maricopa-Casa Grande Hwy NW of Anderson Rd	3,380	30%	1,014	2,366
Gila Bend Hwy W of Fuqua Rd	3,700	35%	1,295	2,405
I-8 W of Stanfield Rd	4,024	90%	3,622	402
Chuichu Rd S of Battaglia Rd	1,710	52%	890	820
I-10 S of Sunland Gin Rd	38,320	90%	34,500	3,820
SR 84 S of Sunland Gin Rd	6,000	45%	2,700	3,300
Selma Hwy E of Tweedy Rd	700	13%	91	609
SR 287 E of Tweedy Rd	4,025	24%	965	3060
McCartney Rd E of Toltec Buttes Rd	1,160	13%	151	1,009
Woodruff Rd E of Toltec Buttes Rd	3,480	13%	452	3,028

Source: Wilson & Company, 2006.

5.0 FUTURE CONDITIONS

The City of Casa Grande expects unprecedented growth within its planning area through the year 2030 planning horizon. The section outlines the approach used to develop future year travel demand forecasts. It begins with a discussion of the process used to develop the future population, employment, and travel demand forecasts. Next, it outlines the approach used to identify transportation improvement needs for the years 2010, 2020, and 2030.

5.1 POPULATION AND EMPLOYMENT FORECASTS

Population and employment forecasts for the years 2010, 2020, and 2030 were developed using the *City of Casa Grande General Plan 2010* in consultation with the City of Casa Grande staff and the Technical Advisory Committee.

Population forecasts were based on an annual growth assumption of 3,000 new dwelling units per year between 2005 and 2030 for the Casa Grande planning area. The magnitude of this growth is consistent with the the 2006 *Pinal County Small Area Transportation Study* and corresponds to recent growth trends. To estimate population, the average number of people per dwelling unit for Casa Grande was estimated at 2.83.

Employment growth was predicted to increase commensurate with the growth in population. In 2005, the ratio of jobs per person was approximately 1:3, or one job for every three residents. By year 2030, this ratio is expected to increase to approximately 1:2, or one job for every two residents to reflect Casa Grande's expected evolving role as a regional employment center. Table 5-1 shows the population and employment projections for the years 2010, 2020, and 2030, along with the year 2000 census data and the year 2005 population and employment estimates.

TABLE 5-1
CASA GRANDE POPULATION AND EMPLOYMENT ESTIMATES

Year	Population	Employment
2000	25,224[1]	11,456[2]
2005	51,227[3]	15,730[4]
2010	91,858[5]	32,089[5]
2020	174,500[5]	66,392[5]
2030	258,871[5]	130,969[5]

Source: Wilson & Company, 2006.

Notes:
1. U.S. Census Bureau
2. US Census Bureau ZIP Code Business Patterns, 2000, for ZIP Code 85222.
3. Includes 5,309 single- and multi-family building permits issued by the City of Casa Grande between 2002 and 2005. Data for 2000 to 2002 permit activity was not readily available.
4. Estimate based on August 2005 InfoUSA employment data.
5. Estimate based on growth projection.

The above population and employment estimates show that, the study area is anticipated to grow at approximately seven percent per year from 2005 to 2030. In 2005, the estimated population is 51,200. In 2030, the population projection is 258,900. Employment is estimated at 15,730 in 2005, and it is projected to increase to 131,000 in 2030.

Several recent transportation planning studies provided a context for the current 2030 growth scenario developed for the Casa Grande planning area:

- *Pinal County Corridor Definition Study,* ADOT, 2005.
- *Maricopa Association of Governments 2030 Placeholder Projections*, MAG, 2003.
- *Casa Grande Multimodal Transportation Study*, Lima & Associates, 2001.
- *Pinal County Small Area Transportation Study,* Kirkham Michael Consulting Engineers, 2006.

The planning area considered within the previous Casa Grande 2001 Multimodal Transportation Study was smaller than the current Casa Grande planning area. While the geographic area of the 2001 and 2006 study areas are different, Table 5-2 shows that the level of growth considered for the current study is over three times more than that of the 2001 study. This table also shows the current socioeconomic forecasts in the context of other similar projections for the Casa Grande planning area.

TABLE 5-2
CASA GRANDE POPULATION AND EMPLOYMENT ESTIMATE COMPARISON

Source	Forecast Year	Socioeconomic Forecast	
		Population	Employment
Casa Grande Multimodal Transportation Study (2001)	2020	81,061	27,412
Pinal Small Area Transportation Study (2006)	2025	302,810	135,000
Maricopa Association of Governments (2003)	2030	94,485	69,025
ADOT Pinal County Corridor Definition Studies (2005)	2030	207,843	105,898
Casa Grande Small Area Transportation Study (2006)	2030	258,871	130,969

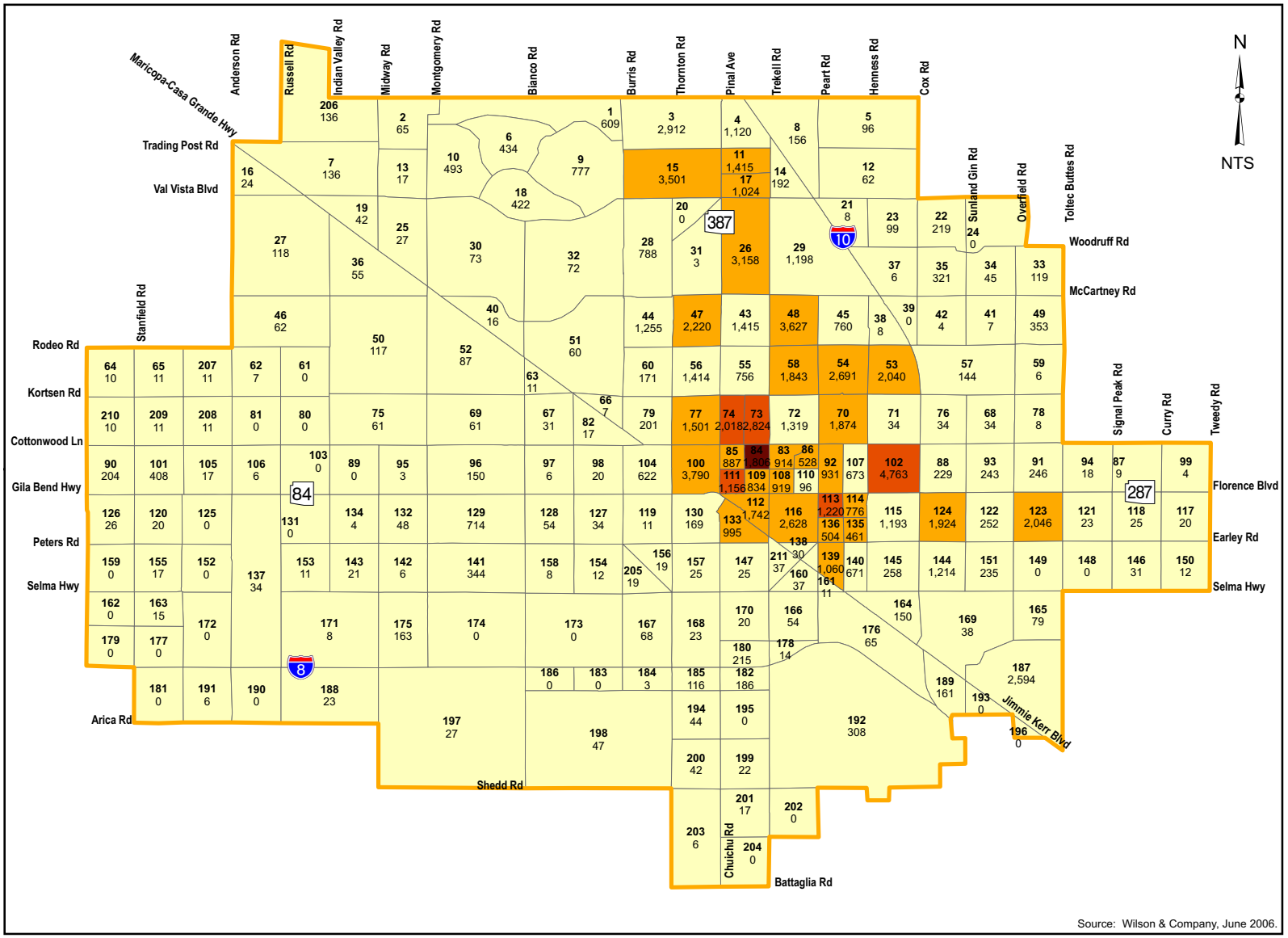
Source: Wilson & Company, 2006.

5.1.1 POPULATION AND EMPLOYMENT ALLOCATION

Working closely with the City of Casa Grande, population and employment for each forecast horizon year were allocated throughout the study area based on currently planned and approved developments and the land use densities and intensities shown in the Casa Grande General Plan 2010. Figures 5-1 to 5-3 show the population forecasts by traffic analysis zone for each forecast horizon: 2010, 2020, and 2030. The traffic analysis zone geography was updated to reflect the anticipated roadway network improvements required to satisfy future travel demand. Population was allocated primarily to key growth corridors, namely Pinal Avenue, Florence Boulevard, Val Vista Road, and Montgomery Road.

Employment was allocated using both planned and approved developments and the land use element of Casa Grande General Plan 2010. Figures 5-4 to Figure 5-5 show the employment forecasts by traffic analysis zone for each forecast horizon: 2010, 2020, and 2030. The General Plan identifies future industrial corridors along Thornton Road and Maricopa-Casa Grande Highway and future commercial centers along Florence Boulevard, Pinal Avenue, and Val Vista Road. Employment growth is expected concurrently with population growth, with new stores and businesses opening to serve the needs of the growing population throughout the study area. Table 5-3 summarizes the year 2010, 2020, and 2030 population and employment projections by TAZ. Appendix E shows the estimated population and employment growth rates by TAZ between year 2006 and year 2030.

YEAR 2010 ESTIMATED POPULATION DENSITY BY TRAFFIC ANALYSIS ZONE



Population Density per Square Mile

- 0 - 1,500
- 1,500 - 4,000
- 4,000 - 6,500
- 6,500 +

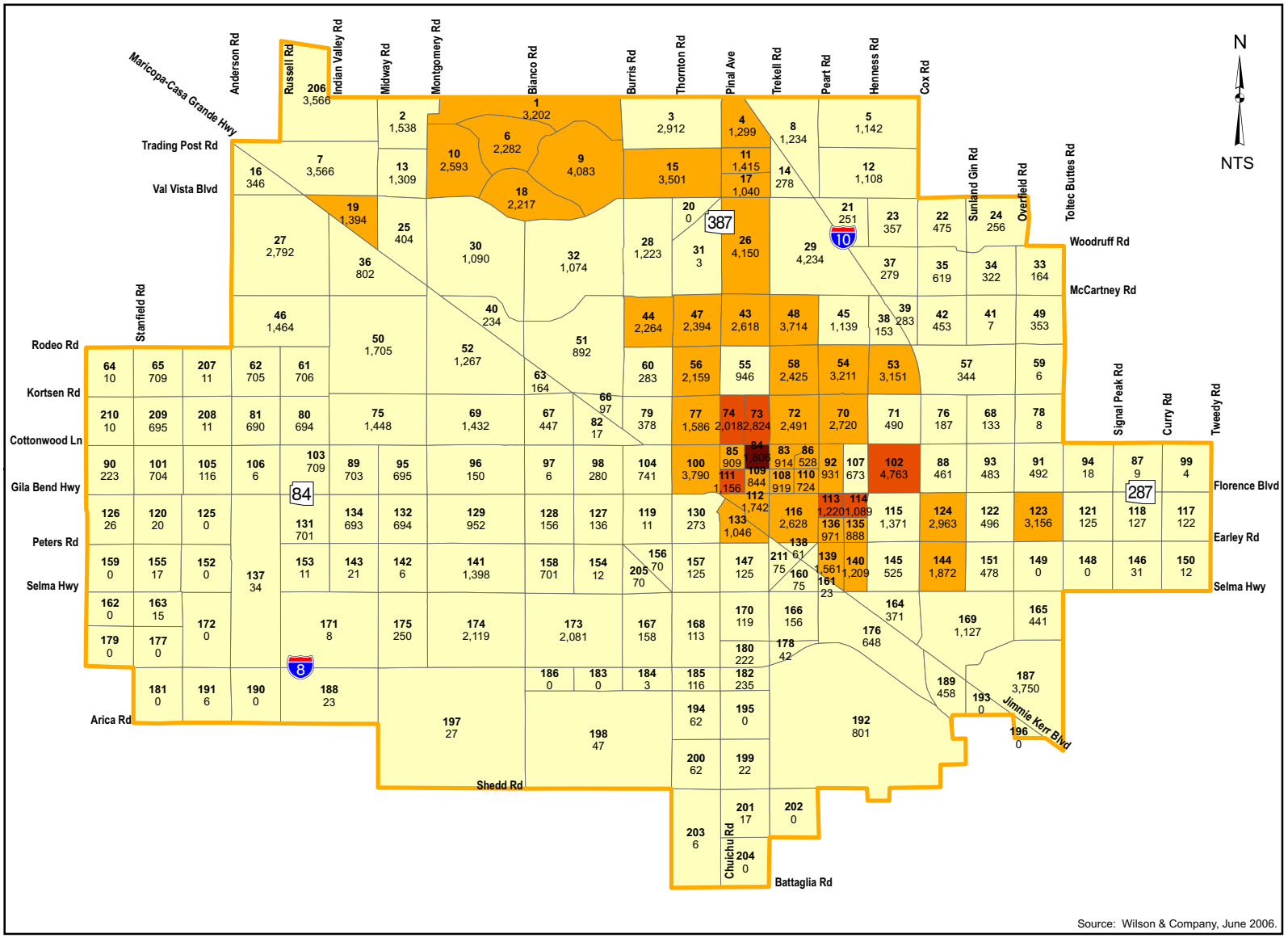
Base Map Features

- Arterials
- Study Area
- XX Traffic Analysis Zone
- X,XXX Population Estimate

FIGURE 5-1

2006 Casa Grande Small Area Transportation Study

YEAR 2020 ESTIMATED POPULATION DENSITY BY TRAFFIC ANALYSIS ZONE



Population Density per Square Mile

- 0 - 1,500
- 1,500 - 4,000
- 4,000 - 6,500
- 6,500 +

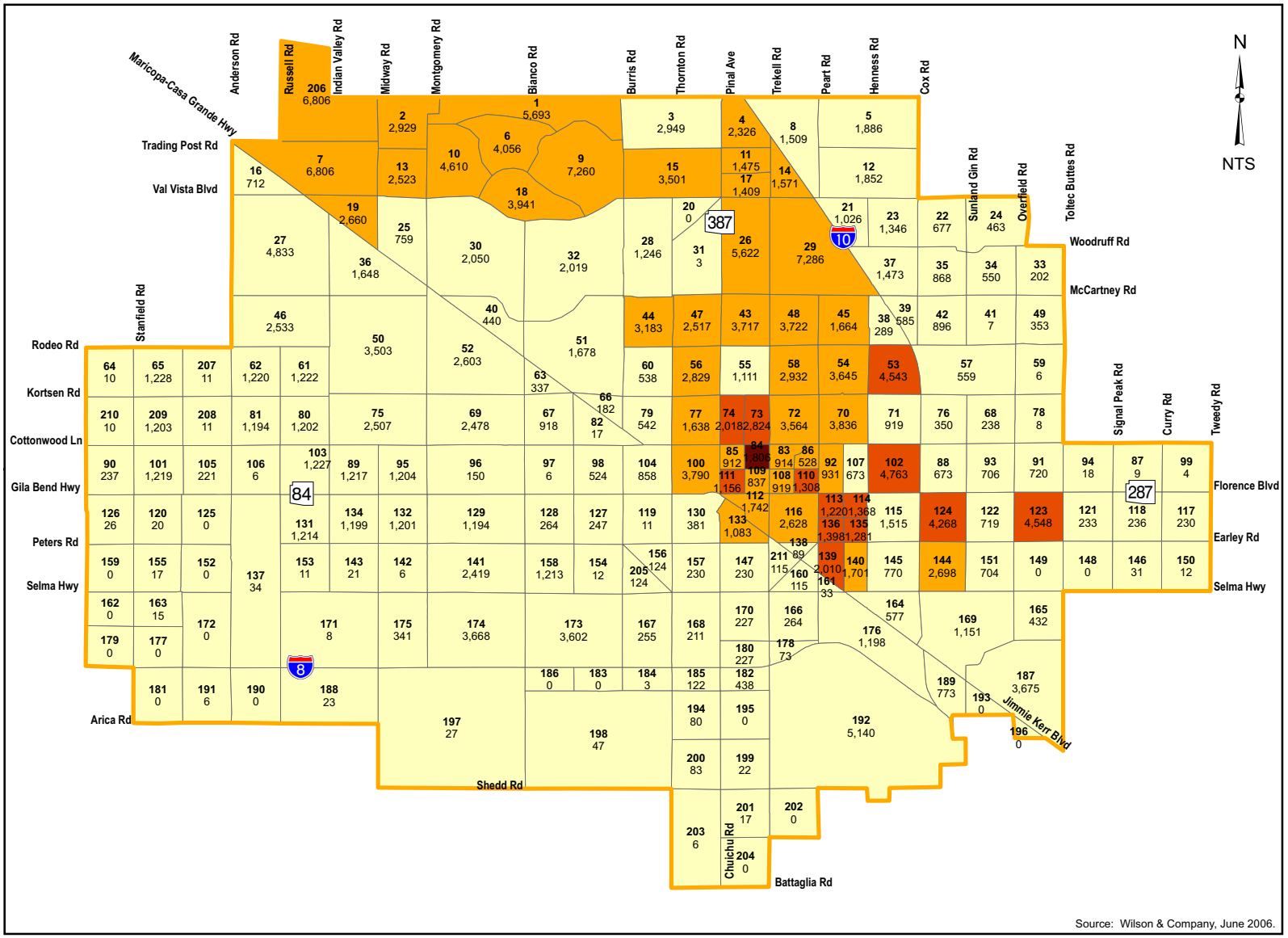
Base Map Features

- Arterials
- Study Area
- XX Traffic Analysis Zone
- X,XXX Population Estimate

Source: Wilson & Company, June 2006.

FIGURE 5-2

2006 Casa Grande Small Area Transportation Study



YEAR 2030 ESTIMATED POPULATION DENSITY BY TRAFFIC ANALYSIS ZONE

Population Density per Square Mile

- 0 - 1,500
- 1,500 - 4,000
- 4,000 - 6,500
- 6,500 +

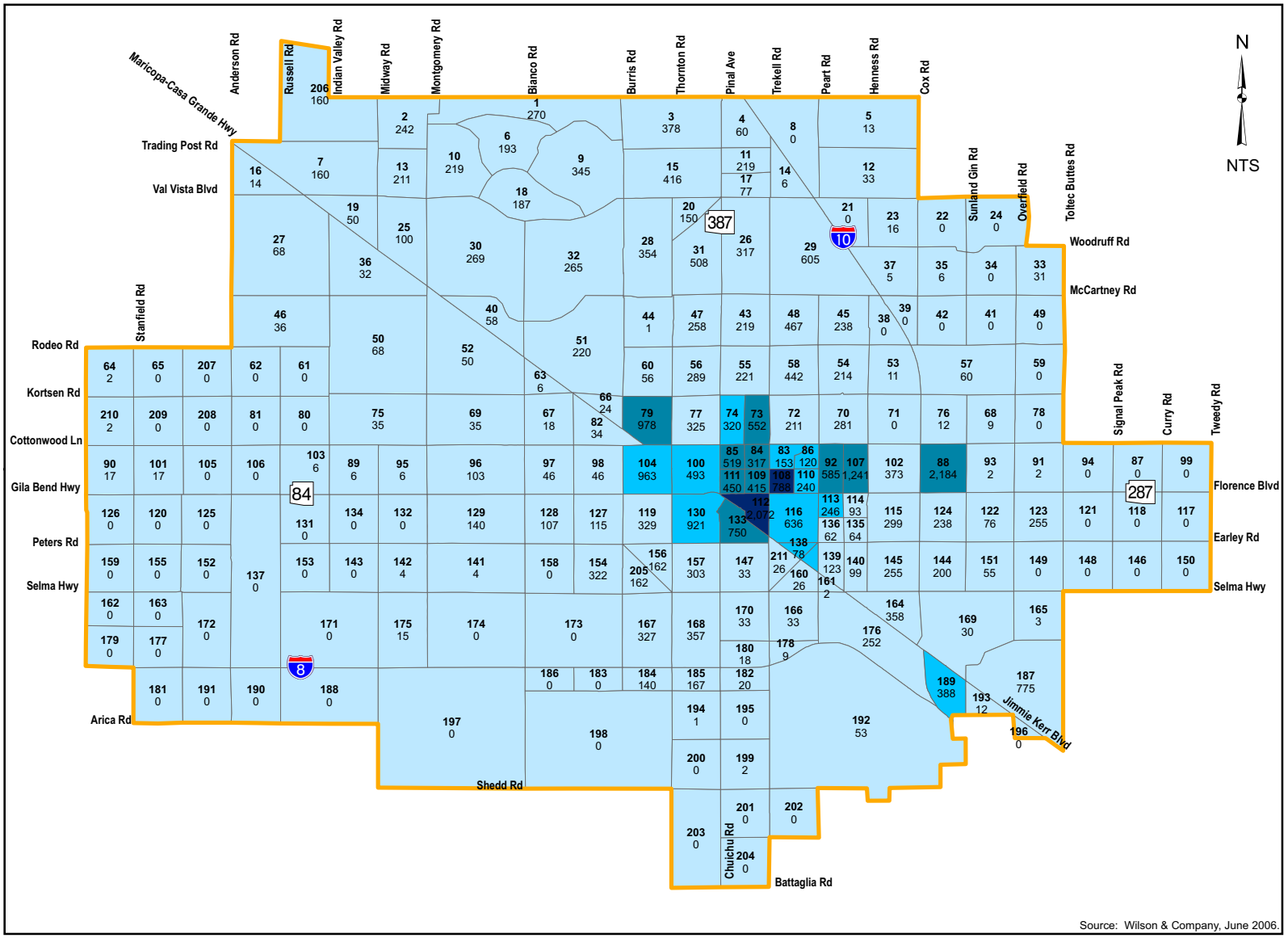
Base Map Features

- Arterials
- Study Area
- XX Traffic Analysis Zone
- X,XXX Population Estimate

FIGURE 5-3

2006 Casa Grande Small Area Transportation Study

YEAR 2010 ESTIMATED EMPLOYMENT DENSITY BY TRAFFIC ANALYSIS ZONE



Employment Density per Square Mile

- 0 - 500
- 500 - 1,000
- 1,000 - 3,000
- 3,000 +

Base Map Features

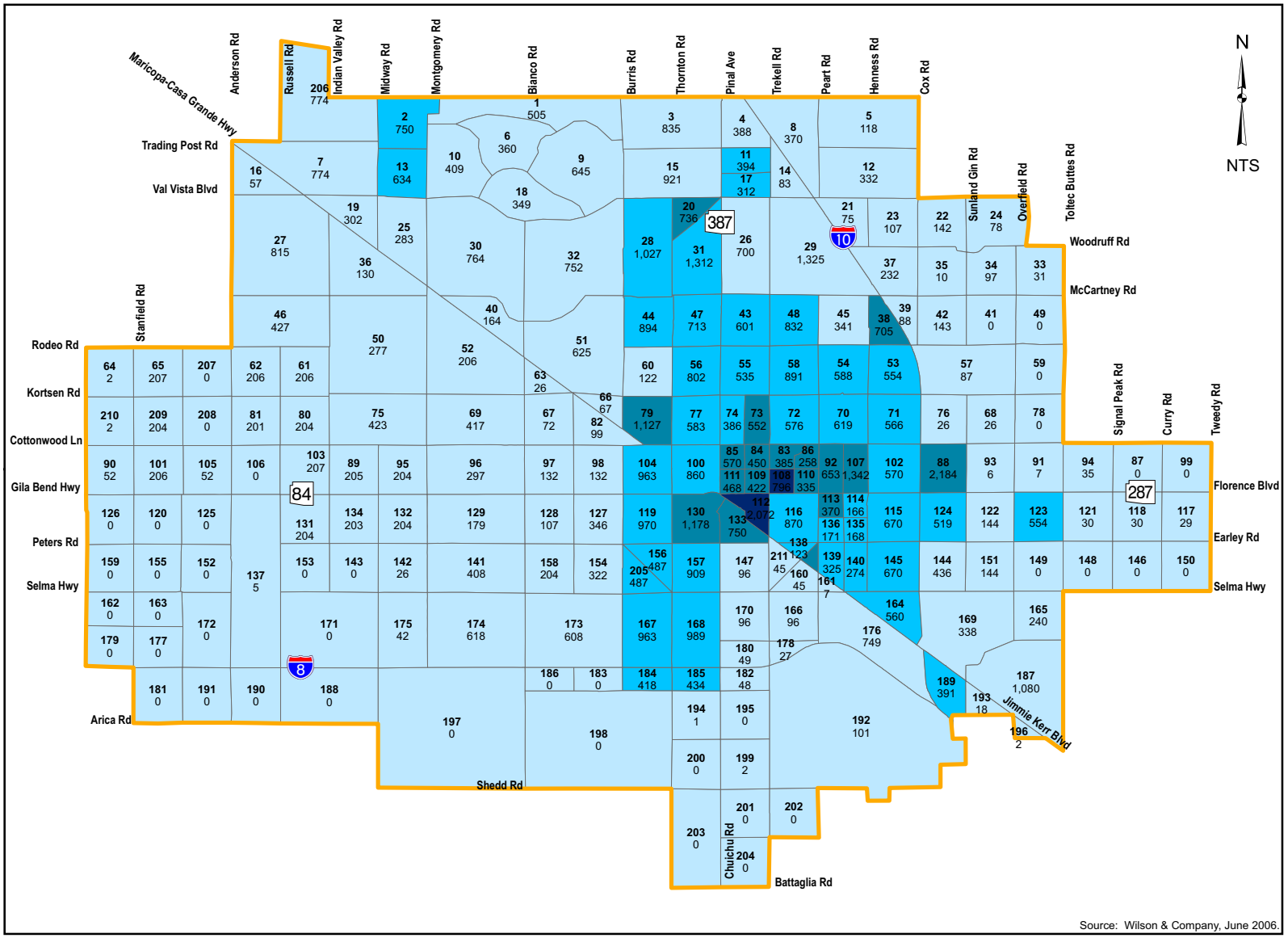
- Arterials
- Study Area
- XX Traffic Analysis Zone
- X,XXX Employment Estimate

Source: Wilson & Company, June 2006.

FIGURE 5-4

2006 Casa Grande Small Area Transportation Study

YEAR 2020 ESTIMATED EMPLOYMENT DENSITY BY TRAFFIC ANALYSIS ZONE



Employment Density per Square Mile

- 0 - 500
- 500 - 1,000
- 1,000 - 3,000
- 3,000 +

Base Map Features

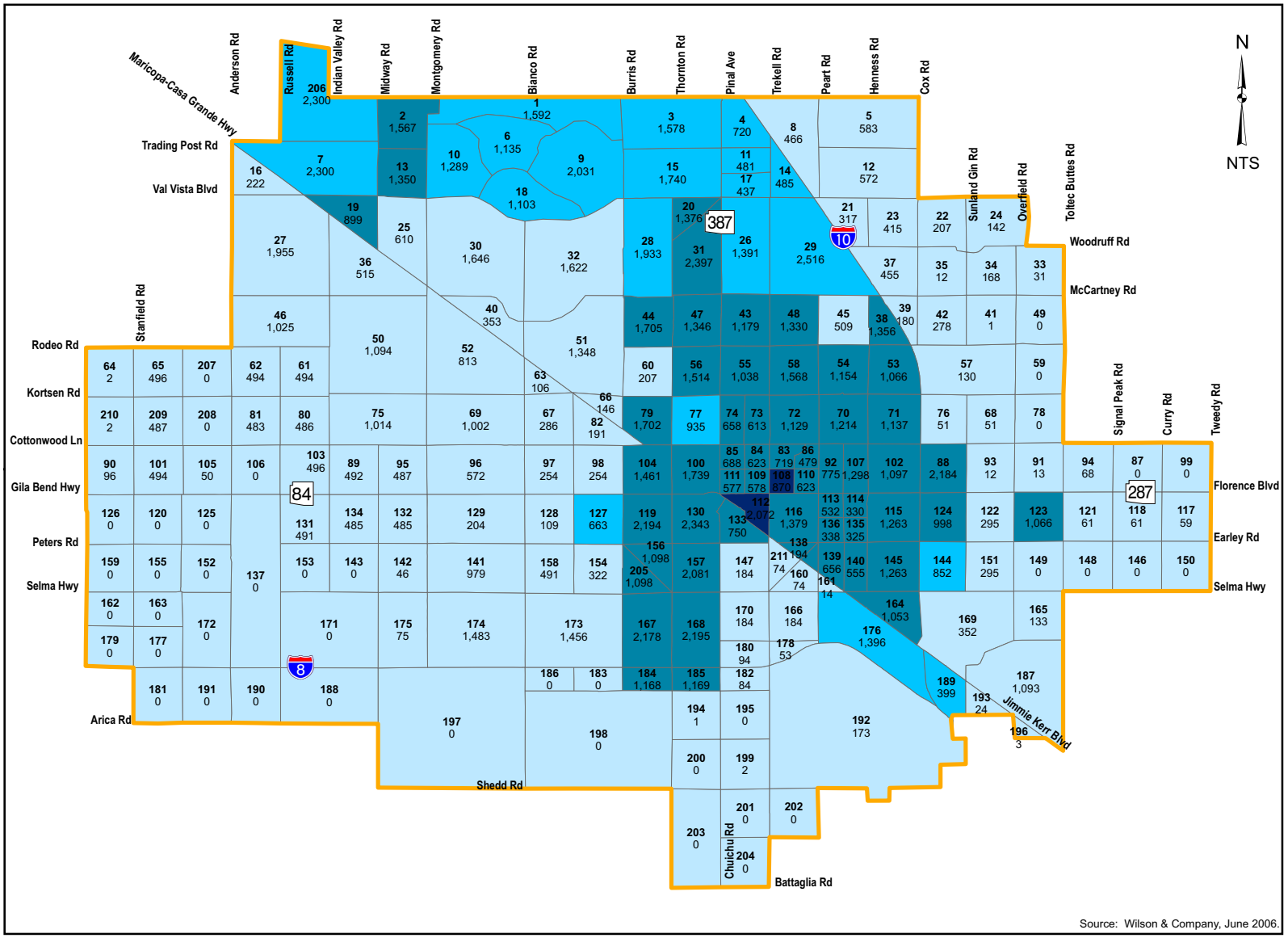
- Arterials
- Study Area
- XX Traffic Analysis Zone
- X,XXX Employment Estimate

Source: Wilson & Company, June 2006.

FIGURE 5-5

2006 Casa Grande Small Area Transportation Study

YEAR 2030 ESTIMATED EMPLOYMENT DENSITY BY TRAFFIC ANALYSIS ZONE



Employment Density per Square Mile

- 0 - 500
- 500 - 1,000
- 1,000 - 3,000
- 3,000 +

Base Map Features

- Arterials
- Study Area
- XX Traffic Analysis Zone
- X,XXX Employment Estimate

Source: Wilson & Company, June 2006.

FIGURE 5-6

2006 Casa Grande Small Area Transportation Study

TABLE 5-3
CASA GRANDE POPULATION AND EMPLOYMENT ESTIMATES BY TRAFFIC ANALYSIS ZONE

TAZ	2010							2020							2030						
	Dwelling Units	Population	Employment					Dwelling Units	Population	Employment					Dwelling Units	Population	Employment				
			Retail	Office	General	Govern-ment	Total			Retail	Office	General	Govern-ment	Total			Retail	Office	General	Govern-ment	Total
1	215	609	116	51	76	27	270	1,221	3,202	217	96	142	50	505	2,011	5,693	685	302	446	159	1,592
2	23	65	85	78	55	24	242	586	1,538	182	160	357	51	750	1,035	2,929	488	268	665	146	1,567
3	1,029	2,912	125	79	150	24	378	1,029	2,912	263	162	359	51	835	1,042	2,949	491	270	670	147	1,578
4	400	1,120	45	7	0	8	60	497	1,299	167	46	109	66	388	822	2,326	314	86	199	121	720
5	34	96	0	6	7	0	13	435	1,142	51	22	33	12	118	666	1,886	254	69	162	98	583
6	153	434	83	37	54	19	193	870	2,282	154	69	101	36	360	1,433	4,056	488	215	318	114	1,135
7	48	136	34	68	46	14	160	1,354	3,566	262	374	109	29	774	2,392	6,806	1,134	622	203	341	2,300
8	63	156	0	0	0	0	0	539	1,234	159	44	104	63	370	533	1,509	203	55	129	79	466
9	274	777	148	66	97	34	345	1,557	4,083	277	122	181	65	645	2,565	7,260	873	386	569	203	2,031
10	174	493	94	42	61	22	219	989	2,593	176	78	114	41	409	1,628	4,610	554	245	361	129	1,289
11	500	1,415	94	42	61	22	219	500	1,415	170	75	110	39	394	522	1,475	230	42	128	81	481
12	22	62	29	0	4	0	33	422	1,108	143	40	93	56	332	655	1,852	249	68	159	96	572
13	6	17	68	68	55	20	211	499	1,309	145	138	307	44	634	891	2,523	420	230	574	126	1,350
14	58	192	6	0	0	0	6	91	278	36	10	23	14	83	555	1,571	211	58	134	82	485
15	1,232	3,501	137	87	165	27	416	1,232	3,501	290	178	396	57	921	1,232	3,501	542	298	738	162	1,740
16	8	24	5	7	0	1	14	132	346	24	11	16	6	57	262	712	97	26	62	37	222
17	400	1,024	33	15	22	7	77	438	1,040	134	38	87	53	312	498	1,409	190	52	121	74	437
18	149	422	81	36	52	19	187	846	2,217	150	66	98	35	349	1,392	3,941	474	210	309	110	1,103
19	15	42	10	21	14	4	50	529	1,394	102	146	43	11	302	935	2,660	443	243	80	133	899
20	0	0	0	9	141	0	150	0	0	279	24	423	10	736	0	0	520	39	790	27	1,376
21	3	8	0	0	0	0	0	102	251	32	9	21	13	75	363	1,026	138	38	88	53	317
22	78	219	0	0	0	0	0	183	475	61	27	40	14	142	241	677	89	39	58	21	207
23	35	99	9	1	6	0	16	136	357	46	13	30	18	107	475	1,346	181	49	115	70	415
24	0	0	0	0	0	0	0	98	256	33	15	22	8	78	165	463	61	27	40	14	142
25	10	27	10	28	60	2	100	154	404	27	73	179	4	283	268	759	51	121	427	11	610
26	1,116	3,158	116	46	106	49	317	1,583	4,150	248	94	254	104	700	1,986	5,622	463	156	474	298	1,391
27	37	118	24	33	3	7	68	1,071	2,792	244	200	304	67	815	1,717	4,833	662	383	673	237	1,955
28	315	788	29	36	274	15	354	528	1,223	75	94	820	38	1,027	498	1,246	140	156	1,529	108	1,933
29	479	1,198	153	196	197	59	605	1,828	4,234	326	401	471	127	1,325	2,914	7,286	607	666	878	365	2,516
30	26	73	28	77	161	4	269	416	1,090	73	197	483	11	764	723	2,050	136	328	1,152	30	1,646
31	1	3	120	37	287	64	508	1	3	316	71	863	62	1,312	1	3	590	117	1,609	81	2,397
32	26	72	27	76	158	4	265	409	1,074	72	194	476	10	752	713	2,019	134	323	1,135	30	1,622
33	42	119	1	1	8	21	31	63	164	1	1	8	21	31	72	202	1	1	8	21	31
34	16	45	0	0	0	0	0	123	322	42	18	27	10	97	194	550	72	32	47	17	168
35	117	321	0	2	4	0	6	244	619	4	2	3	1	10	317	868	5	2	4	1	12
36	18	55	11	16	2	3	32	307	802	56	25	36	13	130	607	1,648	224	61	143	87	515
37	2	6	5	0	0	0	5	100	279	100	44	65	23	232	520	1,473	198	54	126	77	455
38	3	8	0	0	0	0	0	58	153	516	121	2	66	705	102	289	962	201	4	189	1,356

TABLE 5-3 (CONT'D)
CASA GRANDE POPULATION AND EMPLOYMENT ESTIMATES BY TRAFFIC ANALYSIS ZONE

TAZ	2010							2020							2030						
	Dwelling Units	Population	Employment					Dwelling Units	Population	Employment					Dwelling Units	Population	Employment				
			Retail	Office	General	Govern-ment	Total			Retail	Office	General	Govern-ment	Total			Retail	Office	General	Govern-ment	Total
39	0	0	0	0	0	0	0	108	283	38	10	25	15	88	207	585	79	21	50	30	180
40	6	16	6	16	35	0	58	90	234	16	42	104	2	164	155	440	29	70	248	6	353
41	2	7	0	0	0	0	0	2	7	0	0	0	0	0	2	7	0	0	0	1	1
42	1	4	0	0	0	0	0	173	453	60	16	39	28	143	317	896	121	33	77	47	278
43	500	1,415	113	24	56	26	219	999	2,618	302	62	168	69	601	1,313	3,717	564	103	314	198	1,179
44	499	1,255	0	0	1	0	1	972	2,264	284	175	364	71	894	1,265	3,183	531	291	679	204	1,705
45	269	760	102	28	67	41	238	435	1,139	150	41	95	55	341	588	1,664	224	61	143	81	509
46	20	62	13	18	2	4	36	562	1,464	128	105	159	35	427	900	2,533	347	201	353	124	1,025
47	700	2,220	85	54	102	17	258	815	2,394	225	138	306	44	713	794	2,517	419	230	571	126	1,346
48	1,166	3,627	113	272	56	26	467	1,290	3,714	302	293	168	69	832	1,197	3,722	564	254	314	198	1,330
49	103	353	0	0	0	0	0	103	353	0	0	0	0	0	103	353	0	0	0	0	0
50	37	117	24	33	3	7	68	651	1,705	119	53	77	28	277	1,289	3,503	477	130	303	184	1,094
51	21	60	23	63	131	4	220	340	892	60	161	395	9	625	592	1,678	112	268	943	25	1,348
52	28	87	18	25	3	5	50	484	1,267	88	39	58	21	206	958	2,603	354	97	225	137	813
53	721	2,040	0	0	11	0	11	1,203	3,151	256	94	154	50	554	1,606	4,543	478	157	289	142	1,066
54	1,076	2,691	111	24	54	25	214	1,387	3,211	296	60	165	67	588	1,457	3,645	552	101	308	193	1,154
55	298	756	76	80	25	40	221	403	946	200	206	24	105	535	438	1,111	372	343	23	300	1,038
56	645	1,414	95	61	114	19	289	1,064	2,159	253	156	344	49	802	1,291	2,829	471	259	642	142	1,514
57	51	144	16	6	38	0	60	132	344	42	7	37	1	87	198	559	81	9	37	3	130
58	864	1,843	99	205	119	19	442	1,228	2,425	262	221	357	51	891	1,375	2,932	488	268	666	146	1,568
59	2	6	0	0	0	0	0	2	6	0	0	0	0	0	2	6	0	0	0	0	0
60	68	171	15	18	7	16	56	109	283	37	47	23	15	122	190	538	72	80	45	10	207
61	0	0	0	0	0	0	0	271	706	62	50	77	17	206	434	1,222	167	97	170	60	494
62	2	7	0	0	0	0	0	270	705	62	50	77	17	206	433	1,220	167	97	170	60	494
63	4	11	2	3	0	0	6	63	164	11	5	7	3	26	124	337	46	13	29	18	106
64	3	10	0	0	0	2	2	3	10	0	0	0	2	2	3	10	0	0	0	2	2
65	2	11	0	0	0	0	0	272	709	62	51	77	17	207	436	1,228	168	97	171	60	496
66	2	7	2	7	14	0	24	37	97	7	17	43	0	67	64	182	12	29	102	3	146
67	10	31	6	9	0	2	18	171	447	31	14	20	7	72	338	918	125	34	79	48	286
68	12	34	7	0	2	0	9	51	133	20	2	4	0	26	84	238	38	4	8	1	51
69	19	61	12	17	2	4	35	550	1,432	125	102	156	34	417	880	2,478	339	196	345	122	1,002
70	748	1,874	147	30	72	32	281	1,173	2,720	311	64	174	70	619	1,531	3,836	582	106	323	203	1,214
71	12	34	0	0	0	0	0	187	490	207	230	4	125	566	324	919	387	382	8	360	1,137
72	466	1,319	109	23	54	25	211	950	2,491	290	59	161	66	576	1,259	3,564	540	99	301	189	1,129
73	1,082	2,824	100	367	25	60	552	1,082	2,824	100	367	25	60	552	1,082	2,824	173	282	19	139	613
74	642	2,018	133	136	34	17	320	642	2,018	150	118	84	34	386	642	2,018	290	105	161	102	658
75	20	61	13	17	2	4	35	556	1,448	127	103	158	35	423	891	2,507	343	199	349	123	1,014
76	12	34	8	2	2	0	12	71	187	20	2	4	0	26	123	350	38	4	8	1	51

TABLE 5-3 (CONT')
CASA GRANDE POPULATION AND EMPLOYMENT ESTIMATES BY TRAFFIC ANALYSIS ZONE

TAZ	2010							2020							2030						
	Dwelling Units	Population	Employment					Dwelling Units	Population	Employment					Dwelling Units	Population	Employment				
			Retail	Office	General	Govern-ment	Total			Retail	Office	General	Govern-ment	Total			Retail	Office	General	Govern-ment	Total
77	793	1,501	54	194	67	10	325	905	1,586	146	209	199	29	583	865	1,638	281	187	383	84	935
78	3	8	0	0	0	0	0	3	8	0	0	0	0	0	3	8	0	0	0	0	0
79	91	201	477	17	478	6	978	185	378	459	41	610	17	1,127	245	542	445	70	1,139	48	1,702
80	0	0	0	0	0	0	0	267	694	61	50	76	17	204	427	1,202	165	95	167	59	486
81	0	0	0	0	0	0	0	265	690	60	49	75	17	201	424	1,194	163	95	166	59	483
82	6	17	4	6	24	0	34	6	17	10	15	71	3	99	6	17	20	25	136	10	191
83	340	914	67	68	12	6	153	340	914	177	176	17	15	385	340	914	341	302	32	44	719
84	668	1,806	58	249	5	5	317	668	1,806	154	268	15	13	450	668	1,806	296	261	28	38	623
85	276	887	119	311	84	5	519	306	909	142	335	81	12	570	284	912	273	299	81	35	688
86	211	528	45	68	3	4	120	211	528	119	118	11	10	258	211	528	228	201	21	29	479
87	3	9	0	0	0	0	0	3	9	0	0	0	0	0	3	9	0	0	0	0	0
88	81	229	2,184	0	0	0	2,184	176	461	2,184	0	0	0	2,184	238	673	2,184	0	0	0	2,184
89	0	0	0	0	6	0	6	270	703	61	50	77	17	205	432	1,217	167	96	169	60	492
90	63	204	4	6	7	0	17	75	223	10	17	22	3	52	74	237	19	28	42	7	96
91	87	246	2	0	0	0	2	188	492	7	0	0	0	7	255	720	13	0	0	0	13
92	372	931	193	370	10	12	585	372	931	186	399	34	34	653	372	931	252	356	66	101	775
93	86	243	2	0	0	0	2	185	483	6	0	0	0	6	250	706	12	0	0	0	12
94	5	18	0	0	0	0	0	5	18	3	2	30	0	35	5	18	5	4	57	2	68
95	1	3	0	1	5	0	6	267	695	61	50	76	17	204	428	1,204	165	95	168	59	487
96	51	150	11	17	71	4	103	51	150	32	43	212	10	297	51	150	62	74	408	28	572
97	2	6	6	6	32	2	46	2	6	14	19	95	4	132	2	6	27	33	182	12	254
98	7	20	6	6	32	2	46	107	280	14	19	95	4	132	185	524	27	33	182	12	254
99	2	4	0	0	0	0	0	2	4	0	0	0	0	0	2	4	0	0	0	0	0
100	1,146	3,790	113	298	56	26	493	1,146	3,790	302	321	168	69	860	1,146	3,790	563	666	313	197	1,739
101	113	408	4	6	7	0	17	270	704	62	50	77	17	206	433	1,219	167	97	170	60	494
102	1,683	4,763	235	47	67	24	373	1,683	4,763	263	97	159	51	570	1,683	4,763	491	162	298	146	1,097
103	0	0	0	0	6	0	6	272	709	62	51	77	17	207	436	1,227	168	97	171	60	496
104	167	622	352	34	575	2	963	215	741	352	34	575	2	963	230	858	328	420	701	12	1,461
105	6	17	0	0	0	0	0	44	116	10	17	22	3	52	78	221	10	15	22	3	50
106	2	6	0	0	0	0	0	2	6	0	0	0	0	0	2	6	0	0	0	0	0
107	261	673	335	884	10	12	1,241	261	673	322	952	34	34	1,342	261	673	312	824	64	98	1,298
108	309	919	591	187	5	5	788	309	919	568	202	14	12	796	309	919	568	241	26	35	870
109	327	834	161	192	30	32	415	357	844	155	207	29	31	422	328	837	273	241	29	35	578
110	34	96	159	61	5	15	240	276	724	154	152	15	14	335	463	1,308	296	261	28	38	623
111	413	1,156	177	253	15	5	450	413	1,156	170	272	14	12	468	413	1,156	273	243	26	35	577
112	508	1,742	264	620	491	697	2,072	508	1,742	264	620	491	697	2,072	508	1,742	264	620	491	697	2,072
113	508	1,220	37	183	18	8	246	508	1,220	97	197	54	22	370	508	1,220	187	176	104	65	532
114	278	776	49	22	16	6	93	421	1,089	77	28	46	15	166	490	1,368	148	49	89	44	330

TABLE 5-3 (CONT')
CASA GRANDE POPULATION AND EMPLOYMENT ESTIMATES BY TRAFFIC ANALYSIS ZONE

TAZ	2010							2020							2030						
	Dwelling Units	Population	Employment					Dwelling Units	Population	Employment					Dwelling Units	Population	Employment				
			Retail	Office	General	Govern-ment	Total			Retail	Office	General	Govern-ment	Total			Retail	Office	General	Govern-ment	Total
115	477	1,193	99	151	23	26	299	592	1,371	262	272	68	68	670	606	1,515	489	453	126	195	1,263
116	873	2,628	360	153	105	18	636	873	2,628	346	165	314	45	870	873	2,628	429	236	585	129	1,379
117	7	20	0	0	0	0	0	46	122	8	12	2	7	29	81	230	16	21	3	19	59
118	9	25	0	0	0	0	0	49	127	9	12	2	7	30	83	236	17	22	3	19	61
119	4	11	15	10	304	0	329	4	11	29	27	911	3	970	4	11	54	433	1,699	8	2,194
120	5	20	0	0	0	0	0	5	20	0	0	0	0	0	5	20	0	0	0	0	0
121	8	23	0	0	0	0	0	48	125	9	12	2	7	30	82	233	17	22	3	19	61
122	89	252	36	16	14	10	76	189	496	37	40	40	27	144	254	719	71	69	76	79	295
123	723	2,046	121	46	64	24	255	1,204	3,156	256	94	154	50	554	1,607	4,548	478	157	289	142	1,066
124	680	1,924	113	43	60	22	238	1,131	2,963	240	88	145	46	519	1,509	4,268	448	146	271	133	998
125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
126	8	26	0	0	0	0	0	8	26	0	0	0	0	0	8	26	0	0	0	0	0
127	12	34	11	10	94	0	115	52	136	31	29	283	3	346	87	247	60	50	545	8	663
128	19	54	0	0	107	0	107	59	156	2	2	103	0	107	93	264	3	3	103	0	109
129	201	714	0	126	14	0	140	289	952	3	136	40	0	179	336	1,194	5	121	77	1	204
130	57	169	184	81	656	0	921	99	273	177	87	911	3	1,178	128	381	172	464	1,699	8	2,343
131	0	0	0	0	0	0	0	269	701	61	50	76	17	204	431	1,214	166	96	169	60	491
132	17	48	0	0	0	0	0	267	694	61	50	76	17	204	427	1,201	164	95	167	59	485
133	271	995	106	519	87	38	750	308	1,046	106	519	87	38	750	295	1,083	106	519	87	38	750
134	1	4	0	0	0	0	0	266	693	61	50	75	17	203	426	1,199	164	95	167	59	485
135	163	461	25	27	6	6	64	339	888	66	68	17	17	168	453	1,281	126	117	32	50	325
136	178	504	30	10	16	6	62	370	971	79	29	48	15	171	494	1,398	151	50	92	45	338
137	7	34	0	0	0	0	0	7	34	5	0	0	0	5	7	34	0	0	0	0	0
138	11	30	13	14	49	3	78	24	61	33	34	47	9	123	32	89	63	59	47	25	194
139	294	1,060	61	17	30	15	123	468	1,561	163	34	91	37	325	558	2,010	314	57	175	110	656
140	237	671	52	10	26	11	99	461	1,209	138	28	77	31	274	601	1,701	265	49	148	93	555
141	121	344	0	4	0	0	4	537	1,398	122	100	152	34	408	860	2,419	331	192	337	119	979
142	1	6	0	4	0	0	4	1	6	2	4	20	0	26	1	6	3	4	39	0	46
143	6	21	0	0	0	0	0	6	21	0	0	0	0	0	6	21	0	0	0	0	0
144	429	1,214	103	22	51	24	200	715	1,872	219	45	122	50	436	954	2,698	408	74	228	142	852
145	91	258	99	107	23	26	255	200	525	262	272	68	68	670	271	770	489	453	126	195	1,263
146	7	31	0	0	0	0	0	7	31	0	0	0	0	0	7	31	0	0	0	0	0
147	9	25	4	5	24	0	33	48	125	11	12	72	1	96	81	230	21	21	139	3	184
148	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
149	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	3	12	0	0	0	0	0	3	12	0	0	0	0	0	3	12	0	0	0	0	0
151	83	235	15	16	14	10	55	183	478	37	40	40	27	144	249	704	71	69	76	79	295
152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 5-3 (CONT')
CASA GRANDE POPULATION AND EMPLOYMENT ESTIMATES BY TRAFFIC ANALYSIS ZONE

TAZ	2010							2020							2030						
	Dwelling Units	Population	Employment					Dwelling Units	Population	Employment					Dwelling Units	Population	Employment				
			Retail	Office	General	Govern-ment	Total			Retail	Office	General	Govern-ment	Total			Retail	Office	General	Govern-ment	Total
153	4	11	0	0	0	0	0	4	11	0	0	0	0	0	4	11	0	0	0	0	0
154	3	12	187	0	135	0	322	3	12	187	2	135	0	322	3	12	187	2	135	0	322
155	3	17	0	0	0	0	0	3	17	0	0	0	0	0	3	17	0	0	0	0	0
156	7	19	5	5	152	0	162	27	70	15	14	456	2	487	44	124	27	217	850	4	1,098
157	9	25	10	10	283	0	303	48	125	29	27	850	3	909	81	230	54	433	1,586	8	2,081
158	3	8	0	0	0	0	0	269	701	61	50	76	17	204	431	1,213	166	96	169	60	491
159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	13	37	14	3	9	0	26	29	75	14	5	26	0	45	41	115	14	8	50	2	74
161	4	11	0	0	2	0	2	9	23	1	1	5	0	7	12	33	2	2	10	0	14
162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
163	5	15	0	0	0	0	0	5	15	0	0	0	0	0	5	15	0	0	0	0	0
164	53	150	229	89	19	21	358	141	371	220	226	57	57	560	204	577	407	377	106	163	1,053
165	28	79	3	0	0	0	3	168	441	58	37	13	132	240	153	432	58	25	37	13	133
166	19	54	4	5	24	0	33	59	156	11	12	72	1	96	93	264	21	21	139	3	184
167	24	68	18	17	290	2	327	60	158	46	43	869	5	963	90	255	85	459	1,621	13	2,178
168	8	23	18	17	290	32	357	43	113	46	43	869	31	989	74	211	85	459	1,621	30	2,195
169	14	38	21	9	0	0	30	448	1,127	147	63	96	32	338	407	1,151	151	67	99	35	352
170	7	20	4	5	24	0	33	45	119	11	12	72	1	96	80	227	21	21	139	3	184
171	3	8	0	0	0	0	0	3	8	0	0	0	0	0	3	8	0	0	0	0	0
172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
173	0	0	0	0	0	0	0	799	2,081	182	149	227	50	608	1,280	3,602	493	285	501	177	1,456
174	0	0	0	0	0	0	0	813	2,119	185	151	231	51	618	1,303	3,668	502	290	511	180	1,483
175	60	163	0	5	10	0	15	99	250	2	6	34	0	42	125	341	4	5	65	1	75
176	23	65	9	10	233	0	252	247	648	24	27	695	3	749	423	1,198	46	46	1,296	8	1,396
177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
178	5	14	0	3	6	0	9	16	42	3	3	21	0	27	25	73	6	6	40	1	53
179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	65	215	2	5	11	0	18	72	222	6	7	36	0	49	69	227	11	11	70	2	94
181	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
182	49	186	2	7	11	0	20	90	235	4	8	36	0	48	155	438	7	7	69	1	84
183	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
184	1	3	6	0	134	0	140	1	3	16	0	402	0	418	1	3	29	389	750	0	1,168
185	38	116	31	2	134	0	167	44	116	30	2	402	0	434	43	122	29	390	750	0	1,169
186	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
187	919	2,594	314	154	227	80	775	1,435	3,750	438	214	316	112	1,080	1,302	3,675	469	208	307	109	1,093
188	6	23	0	0	0	0	0	6	23	0	0	0	0	0	6	23	0	0	0	0	0
189	57	161	321	61	6	0	388	175	458	309	66	16	0	391	273	773	309	59	31	0	399
190	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 5-3 (CONT')
CASA GRANDE POPULATION AND EMPLOYMENT ESTIMATES BY TRAFFIC ANALYSIS ZONE

TAZ	2010							2020							2030						
	Dwelling Units	Population	Employment					Dwelling Units	Population	Employment					Dwelling Units	Population	Employment				
			Retail	Office	General	Govern-ment	Total			Retail	Office	General	Govern-ment	Total			Retail	Office	General	Govern-ment	Total
191	2	6	0	0	0	0	0	2	6	0	0	0	0	0	2	6	0	0	0	0	0
192	103	308	25	6	0	22	53	289	801	67	13	0	21	101	1,720	5,140	129	23	0	21	173
193	0	0	4	6	2	0	12	0	0	4	7	7	0	18	0	0	4	6	14	0	24
194	15	44	0	1	0	0	1	24	62	0	1	0	0	1	28	80	0	1	0	0	1
195	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
196	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	3	0	0	0	3
197	7	27	0	0	0	0	0	7	27	0	0	0	0	0	7	27	0	0	0	0	0
198	15	47	0	0	0	0	0	15	47	0	0	0	0	0	15	47	0	0	0	0	0
199	6	22	2	0	0	0	2	6	22	2	0	0	0	2	6	22	2	0	0	0	2
200	15	42	0	0	0	0	0	24	62	0	0	0	0	0	29	83	0	0	0	0	0
201	4	17	0	0	0	0	0	4	17	0	0	0	0	0	4	17	0	0	0	0	0
202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
203	2	6	0	0	0	0	0	2	6	0	0	0	0	0	2	6	0	0	0	0	0
204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
205	7	19	5	5	152	0	162	27	70	15	14	456	2	487	44	124	27	217	850	4	1,098
206	48	136	34	68	46	14	160	1,354	3,566	262	374	109	29	774	2,392	6,806	1,134	622	203	341	2,300
207	2	11	0	0	0	0	0	2	11	0	0	0	0	0	2	11	0	0	0	0	0
208	2	11	0	0	0	0	0	2	11	0	0	0	0	0	2	11	0	0	0	0	0
209	2	11	0	0	0	0	0	267	695	61	50	76	17	204	428	1,203	165	95	168	59	487
210	3	10	0	0	0	2	2	3	10	0	0	0	2	2	3	10	0	0	0	2	2
211	13	37	14	3	9	0	26	29	75	14	5	26	0	45	41	115	14	8	50	2	74
212	11	30	13	14	49	3	78	24	61	33	34	47	9	123	32	89	63	59	47	25	194

Source: Wilson & Company, 2006.

5.1.2 EXTERNAL TRAFFIC FORECASTS

Another important component of the future year travel demand forecasts is external traffic growth. External traffic growth was estimated based on regional forecasts from the Pinal County SATS travel demand forecasts for year 2025. Table 5-4 shows the existing year 2005 traffic counts and year 2030 external traffic forecasts for the model external stations.

TABLE 5-4
CASA GRANDE TRAVEL DEMAND MODEL FUTURE EXTERNAL VOLUME ESTIMATE

Location	2005 Traffic Count	2010 Estimate	2020 Estimate	2030 Estimate
I-10 S of SR 387	40,000	71,400	129,500	112,000
Pinal Ave S of I-10	11,800	22,700	43,600	47,600
Montgomery Road N of Trading Post Road	-	-	-	93,800
Maricopa-Casa Grande Hwy NW of Anderson Rd	3,381	26,700	45,600	52,000
Val Vista Rd W of Anderson Rd	-	-	23,800	41,400
McCartney Rd W of Anderson Rd	-	-	10,200	33,100
Kortsen Rd W of Fuqua Rd	-	-	10,200	33,100
Gila Bend Hwy W of Fuqua Rd	3,707	13,300	32,000	51,100
I-8 W of Stanfield Rd	4,024	28,400	55,300	72,800
Chuichu Rd S of Battaglia Rd	1,708	13,000	34,200	42,300
I-10 S of Sunland Gin Rd	38,320	79,400	119,000	148,000
SR 84 S of Sunland Gin Rd	6,012	19,200	44,300	52,600
Selma Hwy E of Tweedy Rd	696	4,000	20,900	34,000
SR 287 E of Tweedy Rd	4,025	24,500	38,300	52,000
Kleck Rd W of Toltec Buttes Rd	-	-	19,100	31,000
McCartney Rd E of Toltec Buttes Rd	1,159	6,800	25,900	42,100
Woodruff Rd E of Toltec Buttes Rd	3,478	21,600	17,300	28,000
Val Vista Rd E of Cox Rd	-	-	30,200	49,200

Source: Wilson & Company, 2006.

In 2005, there were approximately 120,000 weekday vehicle trips in and out of the Casa Grande study area, including traffic on I-8 and I-10. Weekday external vehicle trips in the planning area are forecast to grow at 9 percent per year over the 25-year planning horizon. In 2030, it is estimated that there will be over 1 million weekday vehicle trips traveling to and from the study area.

5.2 ROADWAY NETWORK NEEDS

The purpose of the roadway network needs analysis is to define the roadway infrastructure required to satisfy projected travel demand at acceptable levels of service for the year 2010 near-term, the year 2020 mid-term and the year 2030 long-term planning horizons.

5.2.1 YEAR 2010 TRAVEL DEMAND AND NETWORK DEFICIENCIES

Five-year programmed roadway improvement plans from the City of Casa Grande, Pinal County, and ADOT were incorporated into an Existing-Plus-Committed 2010 transportation network. Using trips generated from the year 2010 population and employment growth estimates, the Casa Grande Area Travel Demand Model was used to forecast average daily traffic for year 2010. Over 90 miles, or 30 percent, of surface street segments are expected to operate with poor levels of service (D, E or F) by the 2010 forecast horizon.

Appendix B shows the number of lanes by roadway segment in the Existing-Plus-Committed network and the projected average daily traffic for the study area together with identified deficiencies. The projected traffic volumes and levels of service are summarized by roadway segment. The actual functional capacity of roadways is based on the ability of arterial intersections to accommodate peak hour volumes. Special designs to achieve acceptable levels of service could permit higher volumes. In any event, it is clear that the Casa Grande area roadway network will experience increased near-term congestion.

5.2.2 YEAR 2020 TRAVEL DEMAND AND NETWORK DEFICIENCIES

Population is expected to grow at 7 percent per year between the years 2010 and 2020, and is expected to reach 175,000 by the year 2020. Similarly, employment is also forecast to increase at 7 percent per year between the years 2010 and 2020, reaching 65,000 in the year 2020. The impact of this growth on the Existing-Plus-Committed network is staggering. The Existing-Plus-Committed network of arterial and other surface streets includes approximately 330 centerline miles of roadway facilities. Under year 2020 population and employment conditions, 260 miles, or nearly 80 percent of the Existing-Plus-Committed network would operate at poor levels of service (D, E or F). Clearly, significant improvements measures are needed to meet the travel demand generated by the forecast population and employment growth.

The year 2020 roadway network needs analysis was conducted as an iterative process using the Casa Grande Area Travel Demand Model and the 2020 population and employment forecasts. Additional capacity was added based on the deficiencies identified in the Existing-Plus-Committed roadway network. Roadway widening and additional alignments were based on guidance from City of Casa Grande staff and the Technical Advisory Committee. For example, a new principal arterial may have been extended first as a four-lane arterial for initial network evaluation. If a deficiency was observed that warranted an upgrade, then the full six-lane facility was incorporated into the model network. Next, this revised roadway network was evaluated using the travel demand model. The process was repeated until roadway network capacity matched estimated travel demands.

The Year 2020 Roadway Needs Network is shown in Appendix B. This is the roadway network system needed by year 2020 to accommodate projected travel demand in the Casa Grande Planning Area at an

acceptable level of service. This system also assumes upgrades to state facilities including I-10, SR 387, SR 287, and SR 84.

Appendix B also shows the year 2020 projected traffic volumes together with expected segment level of service. Remaining deficiencies are a result of travel demand that exceeds roadway capacity both on constrained roadways and on roadways that have been widened to their full cross section.

5.2.3 YEAR 2030 TRAVEL DEMAND AND NETWORK DEFICIENCIES

Population is expected to grow at 4 percent per year between year 2020 and 2030, and is expected to reach 259,000 by the year 2030. Employment is similarly forecast to increase at 7 percent per year between year 2020 and 2030, reaching 131,000 by the year 2030. This 10-year growth increment will require significant roadway infrastructure improvements, in addition to those outlined for the year 2020.

A similar, iterative process using the travel demand modeling tool was used to identify the year 2030 improvement needs on the local arterial system. Primarily, the 2030 plan focuses on widening and expanding the arterial grid that was established for the year 2020. In addition to improvement needs identified for the arterial grid, the travel demand forecasts indicated a need for a high capacity expressway system linking I-8 to I-10 via Montgomery Road and Val Vista Boulevard. These two new corridors were also incorporated into the Year 2030 Roadway Needs Network. The Year 2030 Roadway Needs Network is shown in Appendix B, together with the projected traffic volumes and the expected level of service.

5.2.4 SYSTEM PERFORMANCE MEASURES

Several measures were extracted from the TransCAD travel demand model traffic assignments to compare the 2010 Existing Plus Committed Network, the 2020 Roadway Needs Network and the 2030 Roadway Needs Network. These measures include total system lane miles by facility type, total vehicle miles of travel (VMT) and total congested VMT, which is total vehicle miles of travel on segments operating at LOS E or worse. Table 5-5 shows the total system miles required to accommodate year 2020 and 2030 travel demand, and the system performance of each optimized needs network.

Table 5-5 shows that to accommodate the expected year 2030 population and employment growth increment, the year 2010 roadway transportation network would have to almost double from 900 lane miles to nearly 1,800 lane miles by year 2030. The table also shows that even if all the needed improvements are implemented, traffic congestion will continue to be an issue in the Casa Grande planning area due to constraints along portions of the network.

TABLE 5-5
YEAR 2020 AND YEAR 2030 NEEDS NETWORK COMPARISON

System Characteristics	Roadway Network Alternative		
	Year 2010 E+C Network	Year 2020 Needs Network	Year 2030 Needs Network
Roadway System Profile (Lane Miles)			
Interstate/Expressway	143	204	256
6-Lane Arterial	-	350	804
4-Lane Arterial	183	473	542
2-Lane Arterial	64	-	-
2-Lane Collector	520	373	153
Total Lane Miles	910	1,400	1,755
Other Mobility Enhancements			
New Traffic Interchanges	-	2	15
New Overcrossings	-	-	1
Network System Performance			
VMT[1]	4,461,300	8,892,400	13,395,600
Congested VMT[2]	2,678,000	3,057,200	6,359,300
Percent Congested VMT	60	34	47

Source: Wilson & Company, 2006.

Notes: 1) VMT - Vehicle Miles of Travel
2) Congested VMT is vehicle miles of travel at LOS E or worse.

6.0 IMPLEMENTATION PROGRAM

The City of Casa Grande Small Area Transportation Study (SATS) Multimodal Improvement Plan consists of three elements: Roadways, Transit, and Truck Routes. The recommendations for each of these elements are based on technical analyses of existing and future conditions as well as stakeholder and public participation presented in earlier chapters of this document. This chapter includes the following implementation recommendations:

- Future Roadway Functional Classification Plan
- Long Term Roadway Improvement Needs Plan
- Transportation Revenue Outlook
- Cost Constrained Roadway Improvement Plan
- Public Transit Plan
- Regional Truck Route Plan
- Implementation Action Items

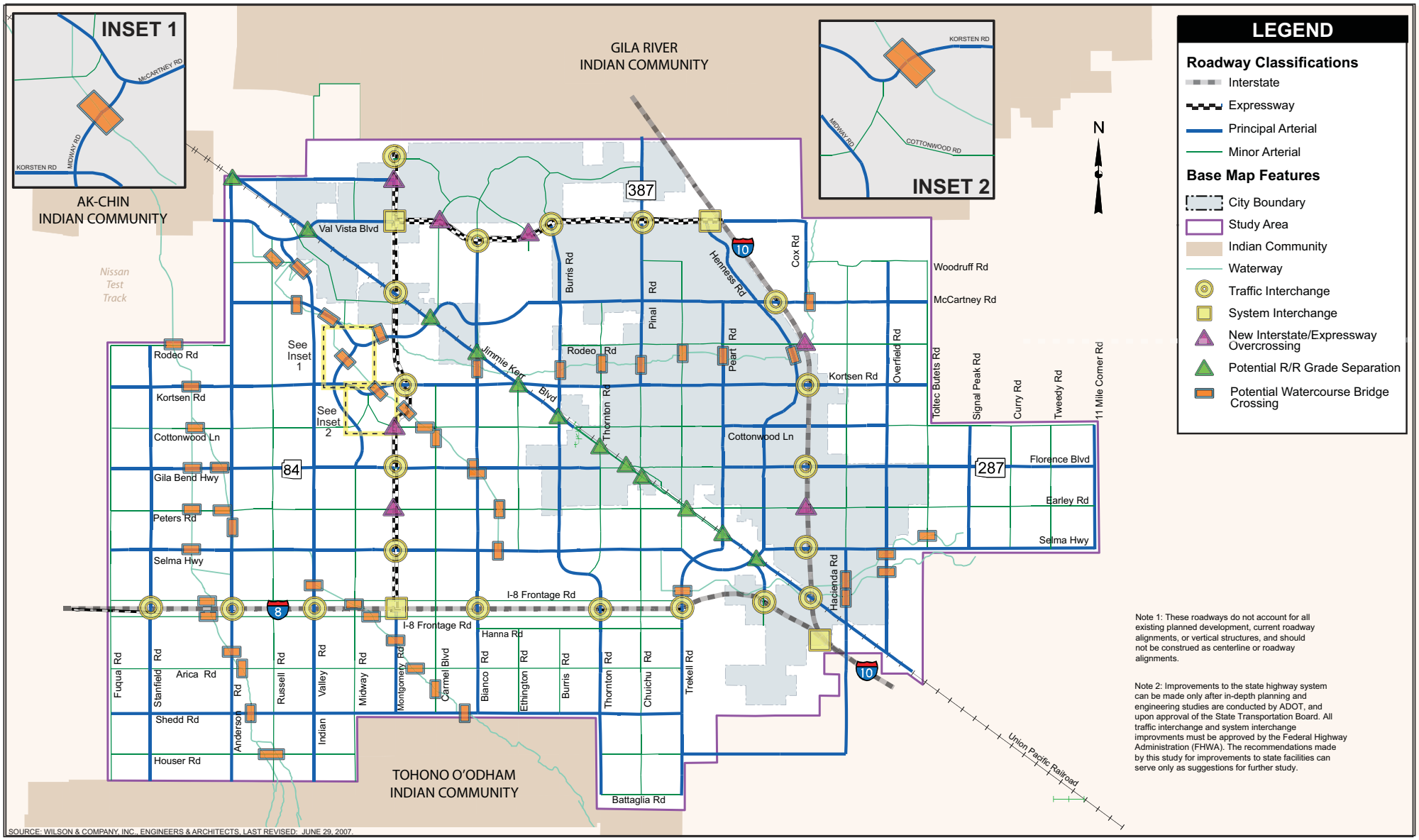
6.1 FUTURE ROADWAY FUNCTIONAL CLASSIFICATION PLAN

The year 2030 travel demand analysis provides the basis for the City of Casa Grande Future Roadway Functional Classification Plan. This functional classification plan was developed in coordination with the City of Casa Grande and the Technical Advisory Committee through the iterative roadway needs assessment process outlined in Chapter 5.

This plan, as shown in Figure 6-1, is based on an east-west, north-south grid concept. The plan builds on the existing grid network serving the residents within the current city limits with extensions and new connections to meet the needs of anticipated growth/development to provide improved sub-regional mobility. In general, it includes 6-lane principal arterials at two-mile intervals with intervening 2- or 4-lane minor arterials at each mile. The circulation networks from several adopted master planned developments are also reflected in this plan. This plan connects new expressways along Montgomery Road and Val Vista Boulevard with I-8 and I-10 to create a high capacity loop system serving the north, northwest, and western portions of the Casa Grande planning area. Two new traffic interchanges on I-10 are also included. Improvements to the state highway system can be made only after in-depth planning and engineering studies are conducted by ADOT, and upon approval of the State Transportation Board. The recommendations made by this study for improvements to state facilities can serve only as suggestions for further study.

The Future Roadway Functional Classification Plan identifies four principal roadway classifications: Interstate, Expressway, Principal Arterial, and Minor Arterial. Although not shown on Figure 6-1, collector facilities would connect with the one-mile arterial grid at mid-section alignments providing access to local neighborhoods and commercial areas.

In addition to identifying future roadway classification, Figure 6-1 also shows improvements required to fully implement the arterial grid and high-capacity roadway system. For high capacity facilities, including I-8,



Note 1: These roadways do not account for all existing planned development, current roadway alignments, or vertical structures, and should not be construed as centerline or roadway alignments.

Note 2: Improvements to the state highway system can be made only after in-depth planning and engineering studies are conducted by ADOT, and upon approval of the State Transportation Board. All traffic interchange and system interchange improvments must be approved by the Federal Highway Administration (FHWA). The recommendations made by this study for improvements to state facilities can serve only as suggestions for further study.

SOURCE: WILSON & COMPANY, INC., ENGINEERS & ARCHITECTS, LAST REVISED: JUNE 29, 2007.

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FIGURE 6-1
Future Roadway Functional Classification Plan

I-10, Val Vista Boulevard, and Montgomery Road, this includes both traffic and system interchange locations. For the arterial grid, this means potential grade separations with the Union Pacific Railroad to enhance safety and maximize system mobility. Numerous major watercourse crossings will also be required to complete the grid.

Right-of-way preservation is critical for implementing the SATS Improvement Plan and accommodating future travel demand. Each roadway classification will require the necessary right-of-way to construct the full cross-section. Specific right-of-way requirements for each planned roadway facility should be considered when reviewing future development proposals. Chapter 7 presents detailed design standards for each of the cross-sections shown in the Future Roadway Functional Classification Plan.

6.2 LONG-TERM ROADWAY IMPROVEMENT PLAN

Based on the roadway improvement needs identified for both years 2020 and 2030, improvement recommendations have been identified to ensure adequate system capacity to handle the magnitude of projected population and employment growth.

6.2.1 LONG-TERM ROADWAY IMPROVEMENT PLAN SUMMARY

Key components of the Long Term Roadway Improvement Plan include completing the arterial grid system and building new high capacity expressways on Montgomery Road and Val Vista Boulevard. Together with I-8 and I-10, these two new high-capacity transportation facilities would provide a loop system around the western and northern edges of central Casa Grande. New access to I-8 is planned at Anderson Road and Henness Rd. New access to I-10 is planned at Kortsen Rd and Selma Highway. Figure 6-2 shows the system improvements necessary to accommodate projected year 2030 travel demand.

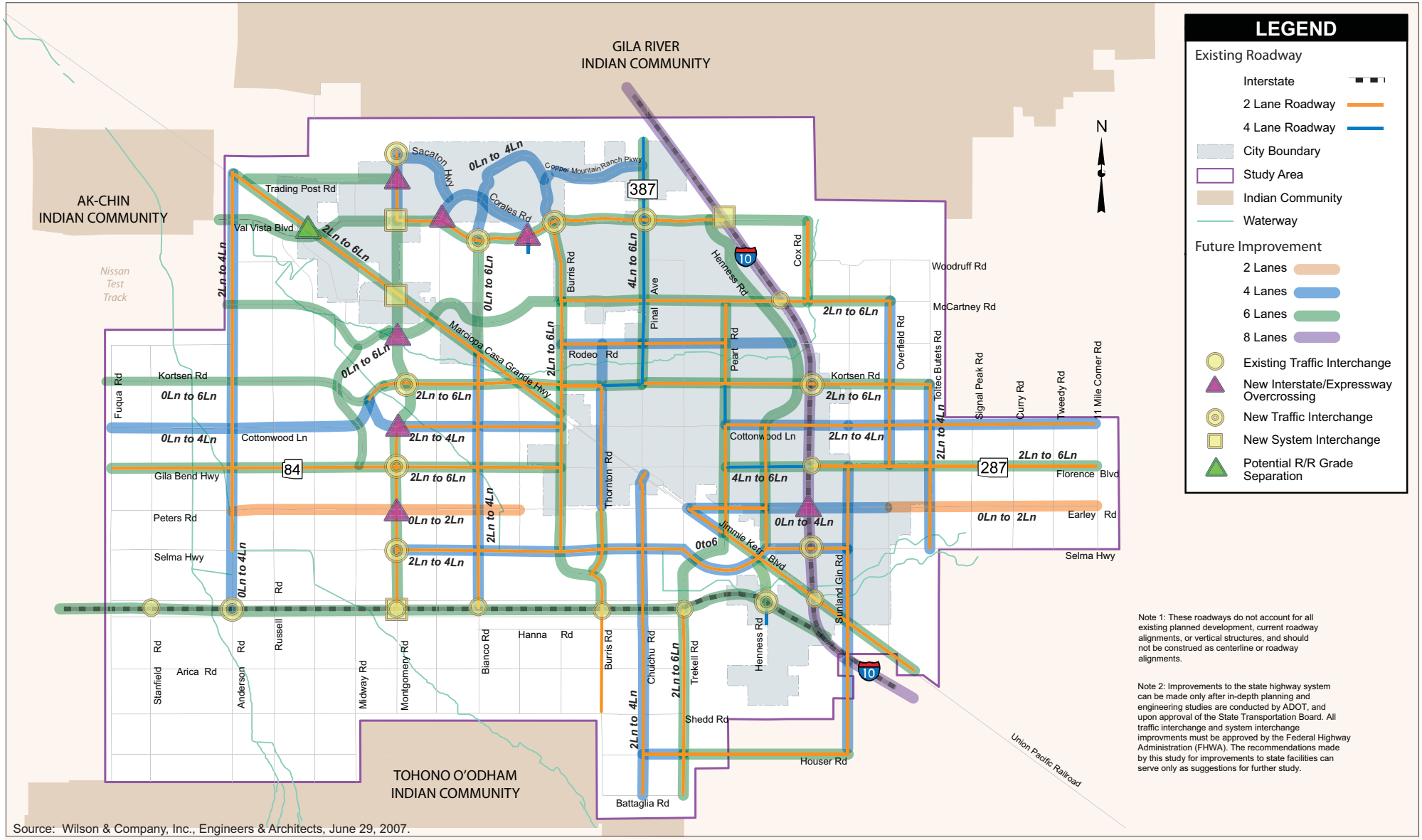
6.2.2 IMPROVEMENT COST ESTIMATES

Generalized planning level unit cost estimates were developed for year the 2020 and 2030 improvement needs. Table 6-1 shows the unit costs used to develop the improvement cost estimates. Table 6-2 and Table 6-3 detail the needed roadway capacity improvements on city, county and state facilities for both the year 2020 and the year 2030 together with planning level improvement cost estimates. When an existing two-lane roadway showed a need to be upgraded to four or six travel lanes, it was assumed that the entire facility would be reconstructed. For existing four-lane roadways showing a need for six travel lanes, it was assumed that the additional lanes would be added without reconstruction to the existing roadway. Expressway construction would require total reconstruction of existing facilities.

TABLE 6-1
ROADWAY IMPROVEMENT UNIT COST ESTIMATE

Unit Description	Improvement Cost Estimate
New Roadway (Lane Mile)	$1.35 million
New Traffic Interchange	$30 million
New System Interchange	$150 million
New Interstate Overcrossing	$5 million

Source: Wilson & Company and Stantec, 2006.



Source: Wilson & Company, Inc., Engineers & Architects, June 29, 2007.

Note 1: These roadways do not account for all existing planned development, current roadway alignments, or vertical structures, and should not be construed as centerline or roadway alignments.

Note 2: Improvements to the state highway system can be made only after in-depth planning and engineering studies are conducted by ADOT, and upon approval of the State Transportation Board. All traffic interchange and system interchange improvments must be approved by the Federal Highway Administration (FHWA). The recommendations made by this study for improvements to state facilities can serve only as suggestions for further study.

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FIGURE 6-2
Year 2030 Roadway Improvement Plan

TABLE 6-2
YEAR 2020 AND YEAR 2030 ROADWAY CAPACITY IMPROVEMENT NEEDS

Location	Length (Miles)	Description	Responsible Agency	Cost[1] (Thousands)
YEAR 2020 ROADWAY IMPROVEMENTS				
Val Vista Blvd: Anderson Rd to Maricopa-Casa Grande Hwy	1.49	Construct New 6 Lane	Pinal County	$12,124
Val Vista Blvd: Maricopa-Casa Grande Hwy to I-10	10.31	Widen to 6 Lanes	Casa Grande	$83,894
Val Vista Blvd: I-10 to Cox Rd	2.02	Widen to 4 Lanes	Pinal County	$10,958
I-10: Val Vista Blvd	-	New Traffic Interchange	ADOT[2]	$30,000
Maricopa-Casa Grande Hwy: Burris Rd to Val Vista Blvd	8.08	Widen to 4 Lanes	Casa Grande/Pinal County	$43,832
Maricopa-Casa Grande Hwy: Val Vista Blvd to Anderson Rd	1.85	Widen to 6 Lanes	Casa Grande/Pinal County	$15,054
Pinal Ave (SR 387): Kortsen Rd to I-10	6.31	Widen to 6 Lanes	ADOT[2]	$17,115
Florence Blvd (SR 287): Peart Rd to Tweedy Rd	8.00	Widen to 6 Lanes	ADOT[2]	$54,084
Jimmie Kerr Blvd: Sunland Gin Rd to Peart Rd	3.76	Widen to 6 Lanes	Casa Grande/Pinal County	$30,596
Jimmie Kerr Blvd: Peart Rd to Trekell Rd	1.25	Widen to 4 Lanes	Casa Grande/Pinal County	$6,781
I-10: Sunland Gin Rd to Val Vista Blvd	12.00	Widen to 8 Lanes	ADOT[2]	$129,400
Thornton Rd: I-8 to Selma Hwy	1.50	Widen to 4 Lanes	Casa Grande/Pinal County	$8,137
Thornton Bypass: Thornton Rd to Burris Rd	1.00	Construct New 4 Lane	Pinal County	$5,425
Gila Bend Hwy (SR 84): Fuqua Rd to Thornton Rd	12.00	Widen to 6 Lanes	ADOT[2]	$92,139
Trading Post Rd: Midway Rd to Montgomery Rd	1.01	Construct New 2 Lane	Casa Grande	$2,739
McCartney Rd: Anderson Rd to Burris Rd	8.49	Construct New 4 Lane	Casa Grande/Pinal County	$46,056
McCartney Rd: Burris Rd to Pinal Ave	2.00	Widen to 4 Lanes	Casa Grande	$11,100
McCartney Rd: Pinal Ave to I-10	2.82	Widen to 6 Lanes	Casa Grande	$7,649
McCartney Rd: I-10 to Cox Rd	0.73	Widen to 6 Lanes	Casa Grande/Pinal County	$5,940
Rodeo Rd: Peart Rd to Northwest Facility	1.65	Construct New 2 Lane	Casa Grande	$4,475
Kortsen Rd: Fuqua Rd to Ethington Rd	9.96	Construct New 2 Lane	Pinal County	$27,015
Kortsen Rd: Ethington Rd to Burris Rd	1.02	Construct New 4 Lane	Pinal County	$5,533
Kortsen Rd: Burris Rd to Thornton Rd	1.00	Widen to 4 Lanes	Casa Grande/Pinal County	$5,533
Kortsen Rd: Pinal Ave to I-10	3.83	Widen to 6 Lanes	Casa Grande	$31,165
Kortsen Rd: I-10 to Toltec Buttes Rd	3.83	Widen to 4 Lanes	Casa Grande/Pinal County	$15,677
Cottonwood Ln: Fuqua Rd to Montgomery Rd	6.97	Construct New 2 Lane	Pinal County	$18,905
Cottonwood Ln: Peart Rd to Sunland Gin Rd	3.01	Widen to 6 Lanes	Casa Grande/Pinal County	$24,493
Cottonwood Ln: Sunland Gin Rd to Overfield Rd	0.99	Widen to 4 Lanes	Pinal County	$5,371

TABLE 6-2 (CONT'D)
YEAR 2020 AND YEAR 2030 ROADWAY CAPACITY IMPROVEMENT NEEDS

Location	Length (Miles)	Description	Responsible Agency	Cost[1] (Thousands)
YEAR 2020 ROADWAY IMPROVEMENTS (CONT'D)				
Selma Hwy: Jimmie Kerr Blvd to Sunland Gin Rd	2.45	Widen to 4 Lanes	Casa Grande/Pinal County	$13,291
Trekell Bypass: Trekell Rd to Peart Rd	1.09	Construct New 4 Lane	Pinal County	$5,913
Indian Valley Rd: Gila Bend Hwy to Maricopa-Casa Grande Hwy	5.68	Construct New 2 Lane	Casa Grande	$15,406
I-8: Montgomery Rd	-	New Traffic Interchange	ADOT[2]	$30,000
Montgomery Rd: I-8 to Cottonwood Ln	4.50	Widen to 4 Lanes	Pinal County	$24,411
Montgomery Rd: Cottonwood Ln to Val Vista Blvd	5.00	Construct New 4 Lane	Casa Grande/Pinal County	$27,124
Bianco Rd: I-8 to Cottonwood Ln	4.50	Widen to 4 Lanes	Pinal County	$24,411
Bianco Rd: Cottonwood Ln to Val Vista Blvd	4.49	Construct New 4 Lane	Casa Grande/Pinal County	$24,357
Burris Rd: Selma Hwy to Gila Bend Hwy	2.00	Widen to 4 Lanes	Casa Grande/Pinal County	$10,849
Burris Rd: Gila Bend Hwy to Cottonwood Ln	1.00	Widen to 6 Lanes	Casa Grande/Pinal County	$8,137
Burris Rd: Cottonwood Ln to Maricopa-Casa Grande Hwy	0.35	Construct New 6 Lane	Casa Grande/Pinal County	$2,848
Burris Rd: Maricopa-Casa Grande Hwy to Kortsen Rd	0.66	Widen to 4 Lanes	Casa Grande/Pinal County	$3,580
Burris Rd: Kortsen Rd to Rodeo Rd	1.00	Construct New 4 Lane	Casa Grande/Pinal County	$5,425
Burris Rd: Rodeo Rd to Val Vista Blvd	3.00	Widen to 4 Lanes	Casa Grande/Pinal County	$16,057
Burris Rd: Val Vista Blvd to Copper Mountain Ranch Pkwy	1.35	Construct New 4 Lane	Casa Grande/Pinal County	$7,269
Chuichu Rd: Battaglia Rd to Jimmie Kerr Blvd	8.00	Widen to 4 Lanes	Casa Grande/Pinal County	$40,640
Trekell Rd: I-8 to Selma Hwy	1.50	Widen to 4 Lanes	Casa Grande/Pinal County	$8,137
Trekell Rd: McCartney Rd to Val Vista Blvd	2.00	Widen to 4 Lanes	Casa Grande	$10,850
Peart Rd: Earley Rd to Florence Blvd	1.00	Widen to 4 Lanes	Casa Grande	$5,425
Peart Rd: McCartney Rd to Val Vista Blvd	2.18	Construct New 4 Lane	Casa Grande	$11,826
Avalon St: Val Vista Blvd to W Waverly Dr	1.00	Widen to 4 Lanes	Pinal County	$5,425
I-8: Henness Rd	-	New Traffic Interchange	ADOT[2]	$30,000
Henness Rd: I-8 to Selma Hwy	1.30	Construct New 2 Lane	Casa Grande	$3,526
Henness Rd: Florence Blvd to Cottonwood Ln	1.00	Widen to 4 Lanes	Casa Grande	$5,425
Northwest Facility: Cottonwood Ln to McCartney Rd	3.35	Construct New 4 Lane	Casa Grande	$18,281
Sunland Gin Rd: Earley Rd to Florence Blvd	1.00	Widen to 4 Lanes	Casa Grande	$5,425
Overfield Rd: Florence Blvd to McCartney Rd	4.00	Widen to 4 Lanes	Pinal County	$21,699
Sacaton Pkwy: Montgomery Rd to Corales Rd	2.01	Construct New 4 Lane	Developer	$10,904

TABLE 6-2 (CONT'D)
YEAR 2020 AND YEAR 2030 ROADWAY CAPACITY IMPROVEMENT NEEDS

Location	Length (Miles)	Description	Responsible Agency	Cost[1] (Thousands)
YEAR 2020 ROADWAY IMPROVEMENTS (CONT'D)				
Desert Color Pkwy: Sacaton Pkwy to Copper Mountain Ranch Pkwy	2.17	Construct New 2 Lane	Developer	$5,886
Corales Rd: Val Vista Blvd to Val Vista Blvd	2.84	Construct New 4 Lane	Developer	$15,406
Copper Mountain Ranch Pkwy: Corales Rd to Pinal Ave	4.79	Construct New 4 Lane	Developer	$25,985
			Total 2020 Estimated Improvement Needs	**$1,195,108**
YEAR 2030 ROADWAY IMPROVEMENTS				
Anderson Rd: I-8 to Selma Hwy	1.50	Construct New 2 Lane	Casa Grande/Pinal County	$4,069
Anderson Rd: Cottonwood Ln to Maricopa-Casa Grande Hwy	6.10	Widen to 4 Lanes	Pinal County	$33,091
Bianco Rd: Maricopa-Casa Grande Hwy to Val Vista Blvd	2.72	Widen to 6 Lanes	Casa Grande/Pinal County	$7,378
Burris Rd: Peters Rd to Gila Bend Hwy	1.00	Widen to 6 Lanes	Casa Grande	$2,712
Burris Rd: Maricopa-Casa Grande Hwy to Val Vista Blvd	4.62	Widen to 6 Lanes	Casa Grande/Pinal County	$12,531
Cottonwood Ln: Stanfield Rd to Burris Rd	10.00	Widen to 4 Lanes	Pinal County	$54,301
Cottonwood Ln: Sunland Gin Rd to Toltec Buttes Rd	2.00	Widen to 6 Lanes	Pinal County	$10,741
Cottonwood Ln: Toltec Buttes Rd to Tweedy Rd	3.00	Widen to 4 Lanes	Pinal County	$16,436
Cox Rd: McCartney Rd to Val Vista Blvd	2.00	Widen to 6 Lanes	Pinal County	$16,274
Earley Rd: Overfield Rd to Tweedy Rd	4.02	Construct New 2 Lane	Casa Grande/Pinal County	$10,904
Earley Rd: Jimmie Kerr Blvd to Overfield Rd	4.83	Widen to 4 Lanes	Casa Grande/Pinal County	$26,201
Earley Rd: I-10 Overcrossing	-	New Interstate Overcrossing	Casa Grande	$5,000
Hanna Rd: Thornton Rd to Trekell Rd	2.00	Widen to 4 Lanes	Pinal County	$10,850
Henness Rd: I-8 to Kortsen Rd	5.30	Widen to 6 Lanes	Casa Grande/Pinal County	$37,702
Houser Rd: Chuichu Rd to Trekell Rd	1.00	Widen to 4 Lanes	Pinal County	$5,425
Houser Rd: Trekell Rd to Sunland Gin Rd	4.00	Widen to 6 Lanes	Pinal County	$32,549
Kortsen Rd: Fuqua Rd to Pinal Ave	13.00	Widen to 6 Lanes	Casa Grande/Pinal County	$89,237
Kortsen Rd: I-10 to Toltec Buttes Rd	3.00	Widen to 6 Lanes	Casa Grande/Pinal County	$7,838
McCartney Rd: Anderson Rd to Pinal Ave	10.54	Widen to 6 Lanes	Casa Grande/Pinal County	$28,588
McCartney Rd: Cox Rd to Overfield Rd	2.00	Widen to 6 Lanes	Pinal County	$5,478
Midway Rd: Maricopa-Casa Grande Hwy to Trading Post Rd	2.11	Widen to 4 Lanes	Casa Grande	$11,446
Peart Rd: Selma Hwy to Val Vista Blvd	9.18	Widen to 6 Lanes	Casa Grande/Pinal County	$46,598
Peters Rd: Anderson Rd to Ethington Rd	7.02	Construct New 2 Lane	Pinal County	$19,040

TABLE 6-2 (CONT'D)
YEAR 2020 AND YEAR 2030 ROADWAY CAPACITY IMPROVEMENT NEEDS

Location	Length (Miles)	Description	Responsible Agency	Cost[1] (Thousands)
YEAR 2030 ROADWAY IMPROVEMENTS (CONT'D)				
Rodeo Rd: Burris Rd to Pinal Ave	2.00	Widen to 4 Lanes	Casa Grande/Pinal County	$10,741
Rodeo Rd: Trekell Rd to Northwest Facility	2.64	Widen to 4 Lanes	Casa Grande	$14,321
Selma Hwy: Midway Rd to Jimmie Kerr Blvd	9.50	Widen to 4 Lanes	Pinal County	$51,697
Selma Hwy: Sunland Gin Rd to Tweedy Rd	5.00	Widen to 4 Lanes	Casa Grande/Pinal County	$27,232
Sunland Gin Rd: Houser Rd to I-10	2.06	Widen to 6 Lanes	Pinal County	$16,762
Sunland Gin Rd: I-10 to Earley Rd	3.96	Widen to 4 Lanes	Casa Grande	$21,482
Thornton Bypass: Thornton Rd to Burris Rd	1.00	Widen to 6 Lanes	Pinal County	$2,712
Thornton Rd: I-8 to Selma Hwy	1.50	Widen to 6 Lanes	Pinal County	$4,069
Thornton Rd: Selma Hwy to Peters Road	1.00	Widen to 4 Lanes	Pinal County	$5,425
Thornton Rd: Cottonwood Ln to Kortsen Rd	1.00	Widen to 4 Lanes	Casa Grande/Pinal County	$5,425
Thornton Rd: Kortsen Rd to Rodeo Rd	1.00	Construct New 4 Lane	Casa Grande	$5,425
Thornton Rd: Rodeo Rd to McCartney Rd	1.00	Widen to 4 Lanes	Casa Grande/Pinal County	$5,425
Thornton Rd: McCartney Rd to Val Vista Blvd	2.00	Widen to 6 Lanes	Casa Grande	$16,274
Thornton Rd: Val Vista Blvd to Copper Mountain Ranch Pkwy	1.01	Construct New 6 Lane	Pinal County	$8,218
Toltec Buttes Rd: Selma Hwy to Woodruff Rd	7.00	Widen to 4 Lanes	Pinal County	$37,973
Trading Post Rd: Maricopa-Casa Grande Hwy to Montgomery Rd	3.82	Widen to 6 Lanes	Casa Grande/Pinal County	$31,084
Trekell Bypass: Trekell Rd to Peart Rd	1.09	Widen to 6 Lanes	Pinal County	$2,848
Trekell Rd: Houser Rd to I-8	3.50	Widen to 6 Lanes	Pinal County	$28,479
Trekell Rd: Selma Hwy to Jimmie Kerr Blvd	1.13	Widen to 4 Lanes	Pinal County	$6,130
Trekell Rd: McCartney Rd to Val Vista Blvd	2.00	Widen to 6 Lanes	Casa Grande	$5,245
Val Vista Blvd: I-10 to Cox Rd	2.02	Widen to 6 Lanes	Pinal County	$5,479
I-10: Selma Hwy	-	New Traffic Interchange	ADOT[2]	$30,000
I-10: Kortsen Road	-	New Traffic Interchange	ADOT[2]	$30,000
I-8: Fuqua Rd to I-10	18.00	Widen to 6 Lanes	ADOT[2]	$146,100
I-8: Anderson Rd	-	New Traffic Interchange	ADOT[2]	$30,000
Val Vista Blvd: Montgomery Rd to I-10	8.30	Construct New 6 Lane Expy	Casa Grande/Pinal County	$67,500
Val Vista Expressway: Montgomery Rd to	-	New System Interchange	Casa Grande/Pinal County	$150,000
Val Vista Expressway: Corales Rd	-	New Traffic Interchange	Casa Grande/Pinal County	$30,000

TABLE 6-2 (CONT'D)
YEAR 2020 AND YEAR 2030 ROADWAY CAPACITY IMPROVEMENT NEEDS

Location	Length (Miles)	Description	Responsible Agency	Cost[1] (Thousands)
YEAR 2030 ROADWAY IMPROVEMENTS (CONT'D)				
Val Vista Expressway: Pinal Ave	-	New Traffic Interchange	Casa Grande/Pinal County	$30,000
Val Vista Expressway: I-10	-	New System Interchange	Casa Grande/Pinal County	$150,000
Montgomery Rd: I-8 to Val Vista Blvd	9.50	Construct New 6 Lane Expressway	Casa Grande/Pinal County	$77,300
Montgomery Road Expressway: I-8	-	New System Interchange	Casa Grande/Pinal County	$150,000
Montgomery Road Expressway: Selma Hwy	-	New Traffic Interchange	Casa Grande/Pinal County	$30,000
Montgomery Road Expressway: Peters Rd	-	New Traffic Interchange	Casa Grande/Pinal County	$30,000
Montgomery Road Expressway: Gila Bend Hwy	-	New Traffic Interchange	Casa Grande/Pinal County	$30,000
Montgomery Road Expressway: Cottonwood Ln	-	New Traffic Interchange	Casa Grande/Pinal County	$30,000
Montgomery Road Expressway: Kortsen Rd	-	New Traffic Interchange	Casa Grande/Pinal County	$30,000
Montgomery Road Expressway: McCartney Rd	-	New Traffic Interchange	Casa Grande/Pinal County	$30,000
Montgomery Road Expressway: Val Vista Blvd	-	New Traffic Interchange	Casa Grande/Pinal County	$30,000
			Total 2030 Estimated Improvement Needs	**$2,057,735**
Total Estimated Improvement Needs				**$3,252,843**

Source: Stantec Consulting and Wilson & Company, 2006.

Notes:

1. Planning level construction cost estimates are in year 2006 dollars. These estimates do not include any allowance for right-of-way. The cost of new structures is included only in the estimates for new traffic interchanges or interstate overcrossings.

2. Improvements to the state highway system can be made only after in-depth planning and engineering studies are conducted by ADOT, and upon approval of the State Transportation Board. The recommendations made by this study for improvements to state facilities can serve only as suggestions for further study.

Table 6-2 shows that the estimated cost of system improvement needs to accommodate the year 2020 travel demands are over $1.1 billion in year 2006 dollars. The roadway infrastructure needed to accommodate the year 2030 travel demands are approximately $2 billion. The total estimated year 2030 roadway improvement needs for the Casa Grande planning area is approximately $3.1 billion in year 2006 dollars.

6.3 TRANSPORTATION REVENUE OUTLOOK

This section examines total existing and potential revenues available for transportation funding between the years 2010 and 2030. Projected operations and maintenance costs for the Casa Grande roadway system are estimated, and an estimate of total revenue available for transportation improvements through year 2030 is provided.

6.3.1 EXISTING AND POTENTIAL REVENUE SOURCES

The City of Casa Grande has several revenue sources available for transportation funding:

- **Highway User Revenue Fund (HURF).** This is the principal source of funding for roadway construction and maintenance in Arizona. HURF revenues come from a variety of sources including state motor fuel taxes, motor carrier taxes, vehicle registration fees and a portion of vehicle license taxes. These funds are distributed by formula to every city and county in the state and to ADOT. The State Constitution earmarks HURF funds exclusively for street and highway purposes.
- **Half-Cent Sales Tax.** The Pinal County Transportation Excise Tax, or Half-Cent Sales Tax, was approved by voters in year 2005 and its mandate extends to the year 2025.
- **Local Transportation Assistance Fund (LTAF).** The LTAF provides State Lottery proceeds to cities and towns for transportation improvements. LTAF funds are allocated using a population-based formula.
- **Federal Highway Funds.** Federal Highway Funds are apportioned in accordance with the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) enacted by Congress in year 2005.
- **Developer Impact Fees.** Currently the City of Casa Grande charges private developers a transportation impact fee to offset the costs of transportation improvements. The current transportation impact fee is $965 per dwelling unit.

Table 6-3 shows the projected revenue available to the City of Casa Grande for both transportation capacity improvements and operations and maintenance between the years 2010 and 2030 from the various sources outlined above. These revenue projections are based on current socioeconomic conditions. As population growth occurs, it is likely that Casa Grande's share of revenue from county, state and federal sources would increase. The revenue projections do not include any increase in the City's transportation impact fee.

TABLE 6-3
PROJECTED CITY OF CASA GRANDE TRANSPORTATION REVENUE SOURCES

Funding Source	Period		Total (Thousands)	Notes
	2010 – 2020 (Thousands)	2020 – 2030 (Thousands)		
Sales Tax	$61,460	$70,970	$132,430	1
LTAF	$1,570	$1,570	$3,140	2
HURF	$30,410	$30,410	$60,820	3
Federal Funds	$1,800	$1,800	$3,600	4
Impact Fee	$28,950	$28,950	$57,900	5
Total	**$124,190**	**$133,700**	**$257,890**	

Sources: City of Casa Grande, 2006; CAAG, 2006; Pinal County SATS, 2006.

Notes:

1) The Pinal County Transportation Excise Tax (Half-Cent Sales Tax) is expected to generate $951 million over 20 years. Casa Grande revenue forecast assumes a 15 percent share of this funding.

2) City of Casa Grande share of Local Transportation Assistance Funds (LTAF) from state lottery proceeds is anticipated at $157,000 for FY06-07. This value is held constant for forecast purposes.

3) City of Casa Grande Highway User Revenue Fund (HURF) allocation for FY06-07 is $3.04 million. This value is held constant for forecast purposes.

4) CAAG currently has $1.8 million of federal funds available annually for transportation improvements in Pinal and Gila counties. This value is held constant for forecast purposes, and the Casa Grande revenue forecast assumes a 10 percent share of this funding source. Competitive ranking process, funds are not guaranteed, based FY05-06.

5) City of Casa Grande Transportation Impact Fee is $965 per dwelling unit. There is also an transportation impact fee for commercial development. The expected FY06-07 revenue is $1.5 million. Revenue forecasts from this source are based on a 3,000-dwelling-unit-per-year growth scenario.

6.3.2 PROJECTED OPERATIONS AND MAINTENANCE COSTS

A portion of the revenue estimates would be used for operations and maintenance of the existing roadway system. In the year 2005, the City of Casa Grande maintained approximately 300 lane miles of roadway. It is estimated that the City annually spends about $10,000 per lane mile to maintain the current system. Using these round numbers, future operations and maintenance costs are estimated at $60 million for the 20-year period between 2010 and 2030.

6.3.3 PROJECTED REVENUE AVAILABLE FOR ROADWAY CAPACITY IMPROVEMENTS

In summary, the current revenue projections indicate that there will be approximately $258 million in projected revenue available for improvement and maintenance of the City of Casa Grande's roadway network between the year 2010 and 2030. $60.0 million or approximately 25 percent would be required for roadway operations and maintenance, leaving roughly $200 million available for capacity improvements over the 20 year planning horizon.

6.4 COST-CONSTRAINED ROADWAY IMPROVEMENT PLAN

The cost-constrained roadway improvement plan seeks to identify local roadway improvement projects by balancing future revenue projections with critical local roadway improvement needs to address immediate

and near-term capacity deficiencies and safety needs. Priority roadway improvements were identified based on several mobility factors:

- Improved access to regional transportation facilities
- Alleviation of traffic congestion in the core arterial grid system
- Safety
- Improved sub-regional connectivity to handle increased travel demand from large developments (e.g., Legends, Midway, and Copper Mountain Ranch)

The application of these criteria resulted in the identification of the six (6), high priority roadway construction projects shown in Table 6-4. The primary objective of this SATS is to provide a planning and programming guide for roadway facilities under the City's responsibility. However, two key Arizona Department of Transportation (ADOT) facilities included on this near-term priority list would provide improved local, sub-regional, and regional mobility for the City of Casa Grande. ADOT should consider the improvement recommendations for Pinal Avenue (SR 387), Florence Boulevard (SR 287) in its I-10 Regional Profile Study scheduled for completion in 2008. This study will prioritize improvement needs on the state highway system in the I-10 corridor.

As additional funding becomes available, additional roadway improvement projects from Table 6-2 can be moved forward based on the City's priorities.

TABLE 6-4
COST-CONSTRAINED ROADWAY CONSTRUCTION PROJECTS

Location	Length (Miles)	Description	Responsible Agency	Cost[1] (Thousands)
Florence Blvd (SR 287): Peart Rd to Hacienda Rd	3.00	Widen to 6 Lanes	ADOT[2]	$13,200
Kortsen Rd: Pinal Ave to I-10	3.80	Widen to 6 Lanes	Casa Grande	$31,200
Pinal Ave (SR 387): Kortsen Rd to I-10	6.50	Widen to 6 Lanes	ADOT[2]	$17,100
Val Vista Blvd: Maricopa-Casa Grande Hwy to I-10	10.50	Widen to 6 Lanes	Casa Grande	$83,900
Maricopa-Casa Grande Hwy: Burris Rd to Val Vista Blvd	8.00	Widen to 4 Lanes	Casa Grande/Pinal County	$43,800
McCartney Rd: Pinal Ave to Cox Rd	4.00	Widen to 6 Lanes	Casa Grande	$15,000
			Total	**$204,200**

Source: Wilson & Company, 2006.

1. Planning level construction cost estimates are in year 2006 dollars. These estimates do not include any allowance for right-of-way. The cost of new structures is included only in the estimates for new traffic interchanges or interstate overcrossings.
2. Improvements to the state highway system can be made only after in-depth planning and engineering studies are conducted by ADOT, and upon approval of the State Transportation Board. The recommendations made by this study for improvements to state facilities can serve only as suggestions for further study. Due to the importance of these state-owned facilities to Casa Grande, the city may choose to use its monies to help fund improvements.

6.5 PUBLIC TRANSIT

The outlook for regional public transit service demand was last addressed in the 2001 *Casa Grande Transit Feasibility Study*. This comprehensive 2001 study assessed transit demand through resident and employer surveys and evaluated transit service alternatives, funding and implementation. The study recommended options for implementing rideshare programs, a deviated fixed route starter transit system, and a transit center.

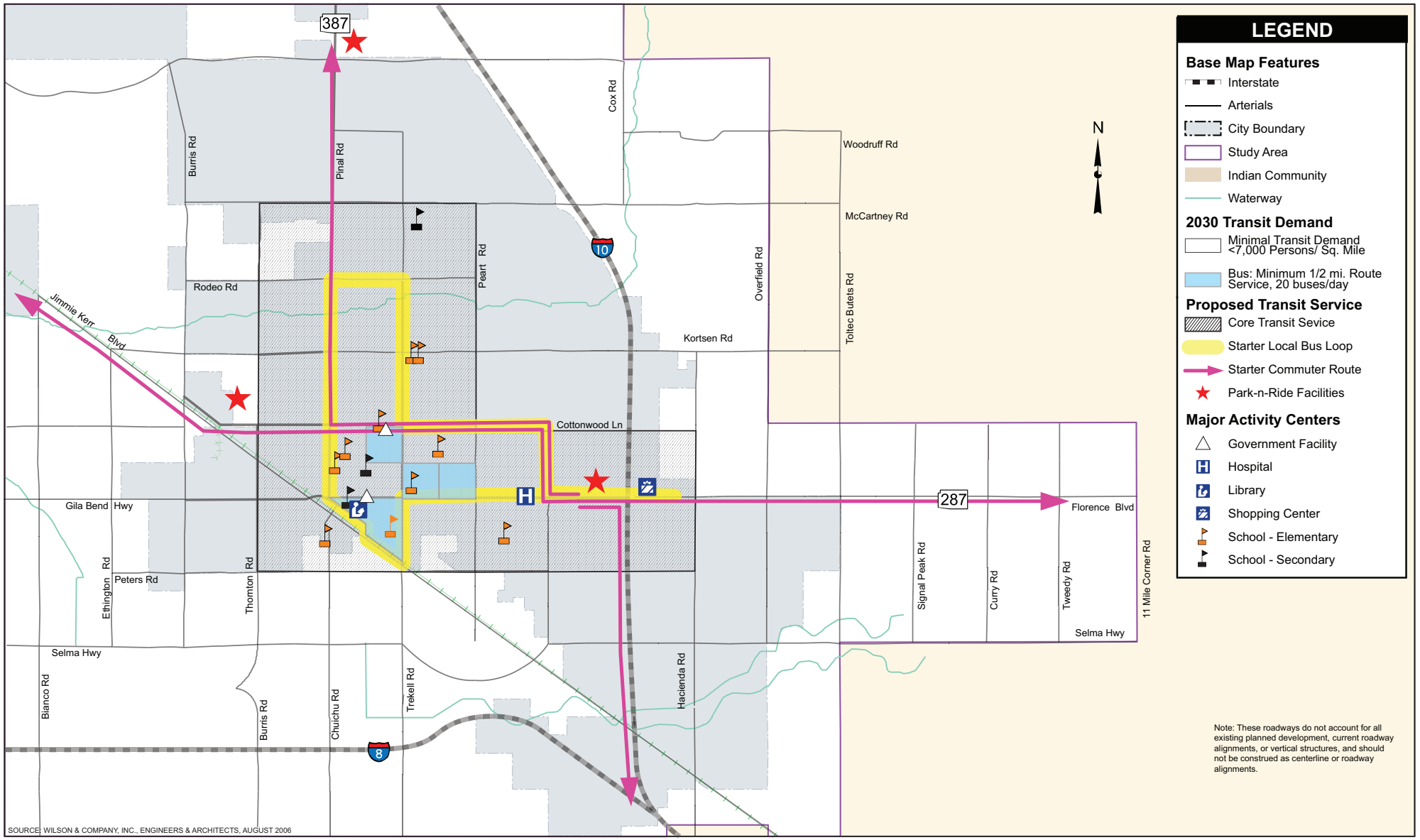
A planning level transit service threshold of a combined population and employment density of 7,000 persons per square mile was applied to the combined 2030 Casa Grande population and employment densities to estimate the demand for potential transit service. The results of this analysis, shown in Figure 6-3, was then used to update the core Casa Grande transit demand area, as well as a proposed "loop" starter service.

The core transit service area includes a variety of activity centers including the regional mall at Florence Boulevard and I-10. The proposed starter local bus loop service would serve this new commercial node as well as schools and government centers in central Casa Grande.

In addition to local transit service, regional commuter routes between Casa Grande and regional activity centers such as the Phoenix metropolitan area, Maricopa, Coolidge/Florence and Eloy should also be considered. As key commuter routes between Casa Grande and employment centers in the Phoenix area become more crowded in the future, regional commuter transit service may help alleviate roadway congestion if certain ridership goals are met. Potential park-n-ride locations to serve these proposed commuter routes are also shown on Figure 6-3.

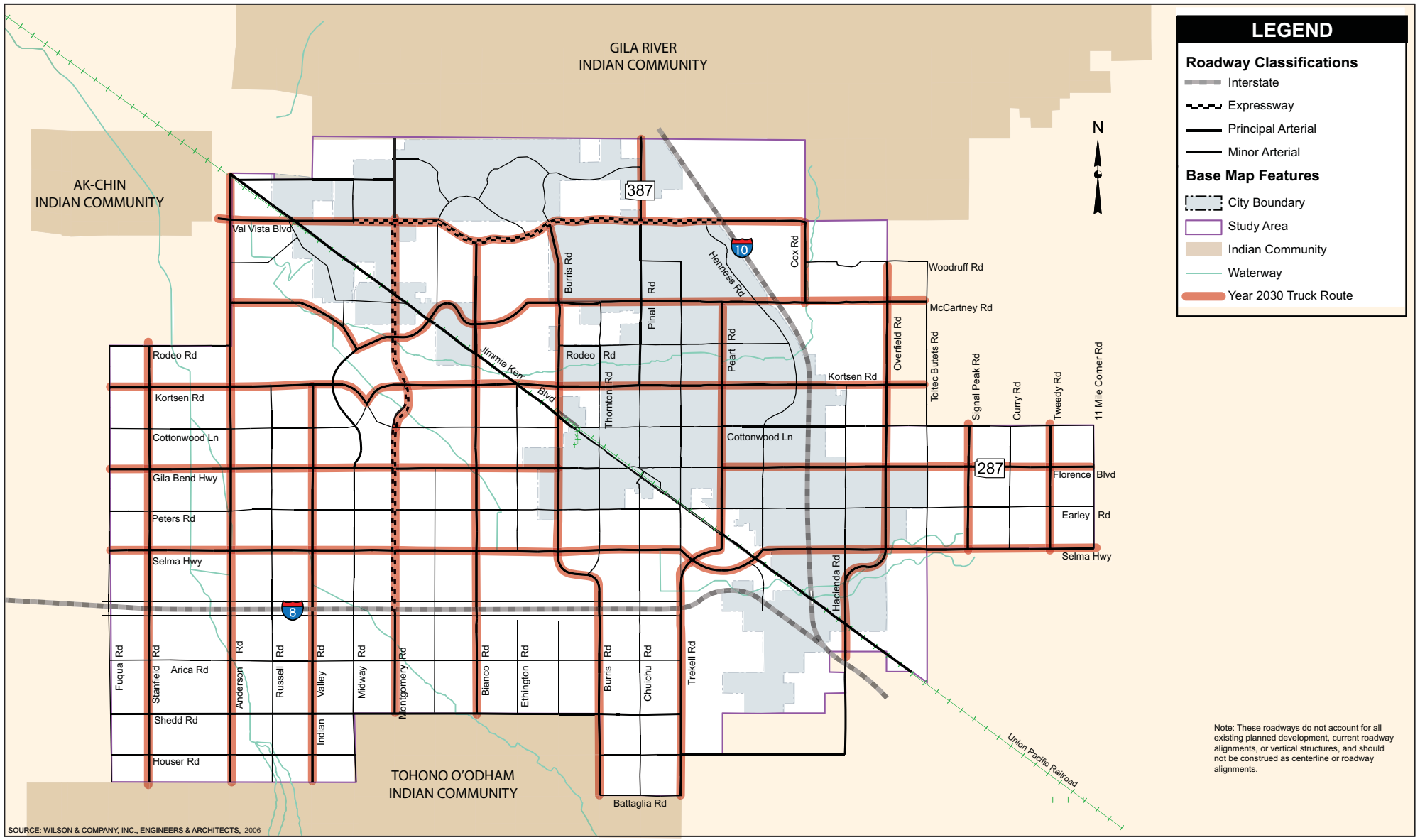
6.6 REGIONAL TRUCK ROUTES

The Casa Grande General Plan identifies the Thornton Road corridor as an industrial employment center. As industrial activity along this corridor increases, so will heavy truck traffic. While some of this truck traffic accesses I-8, a growing number of heavy vehicles traverse through the City on Thornton Road and Cottonwood Lane to access I-10 and the Phoenix metropolitan area. Rather than implement stricter traffic and speed controls to restrict heavy vehicle traffic, a new truck route plan has been developed that includes a north-south route along Burris Road so heavy vehicle traffic can bypass central Casa Grande. This transportation study developed the regional truck route plan that is shown in Figure 6-4.



WILSON & COMPANY
ENGINEERS & ARCHITECTS

FIGURE 6-3
Proposed Local and Commuter Transit Route



WILSON & COMPANY
ENGINEERS & ARCHITECTS

FIGURE 6-4
Year 2030 Truck Route Plan

6.7 IMPLEMENTATION ACTION ITEMS

Key City of Casa Grande action items required to support and implement key elements of this transportation plan include on-going stakeholder coordination, maintaining a current database of traffic information, conducting key corridor studies, participating in regional planning efforts, and periodically updating this transportation study.

6.7.1 STAKEHOLDER COORDINATION

An important part of the long-term roadway improvement plan is continued coordination between the City of Casa Grande and all of its stakeholders. One stakeholder that will be important to the eventual success of the plan is the Gila River Indian Community. Any consideration of potential new routes across tribal lands must be approved by the Gila River Indian Community. This study recommends that on-going communication and coordination be undertaken with the Gila River Indian Community in the interests of future roadway system connectivity. Although proposed extensions of arterial roads or new route connections to the Gila River Indian Community would prove very beneficial to enhancing regional access and mobility, this study does not provide recommendations for roadway connectivity into the Community at this time. The City of Casa Grande should continue to engage with the Gila River Indian Community concerning regional transportation issues and potential extensions of arterial roads or new route connections through the Community.

6.7.2 SYSTEM MONITORING AND SAFETY REVIEW

The City of Casa Grande should continue periodic updates of traffic conditions through a periodic roadway inventory and/or annual system-wide traffic count program. The City should also conduct periodic reviews of roadway accident data to identify safety trends.

6.7.3 CORRIDOR STUDIES

Right-of-way preservation is essential to maintaining the integrity of the planned high capacity regional and sub-regional roadways in this long range transportation plan. Corridor studies typically identify right-of-way footprint, intersection configuration, bridge and other drainage needs, railroad grade separation needs, and potential environmental concerns. It is recommended that the City of Casa Grande, in partnership with key stakeholders, undertake detailed studies to define and evaluate the following corridors:

- Val Vista Boulevard Corridor
- Montgomery Road Expressway Corridor
- Maricopa-Casa Grande Highway Corridor

These corridor studies would be an essential tool in working with adjacent jurisdictions, ADOT and the development community to maintain the integrity of future transportation corridors.

6.7.4 PARTICIPATE IN REGIONAL PLANNING EFFORTS

The City of Casa Grande should engage in continued coordination with and participation in regional and sub-regional transportation studies, including:

- Pinal County Small Area Transportation Study
- Pinal County Routes of Regional Significance
- Maricopa Association of Governments I-8 and I-10 Hidden Valley Roadway Framework Study
- ADOT Corridor Profile Studies
- ADOT Corridor Definition Studies

6.7.5 MONITOR AND UPDATE TRANSPORTATION PLAN

To facilitate periodic updates of the TransCAD travel demand model and project prioritization analysis, the City should maintain current dwelling unit and employment databases. Significant changes in development patterns should trigger an update of the travel demand forecasts. At a minimum, a major review of the transportation plan should be undertaken every five years.

7.0 POLICIES AND GUIDELINES

This section presents the policies and guidelines needed to implement the recommendations of this transportation study. These include traffic impact analysis policies, arterial access management policies, and roadway design guidelines by functional classification.

7.1 ROADWAY FUNCTIONAL CLASSIFICATION

Roads are classified based upon design and traffic characteristics. Functional classification categorizes roads by how they perform in regard to providing access and mobility. A principal arterial, for example, provides mobility for longer distance trips with high speeds and minimal access to adjoining properties. Conversely, the function of a local street is to provide direct access to neighborhoods with lower speeds. These classifications are consistent with the *City of Casa Grande General Plan 2010*. The full functional classification definitions are defined below:

Expressway: This cross-section provides for the high-speed movement of large traffic volumes with no direct access to adjacent land. Expressways can be six, eight, or ten-lane roadways.

Principal Arterial: This facility serves regional circulation needs. It moves traffic at moderate speeds while providing limited access to adjacent land. Access is controlled through raised medians and through spacing and location of driveways and intersections. Generally, a principal arterial is a six- or four-lane facility. Principal arterials are provided at two-mile intervals in the Casa Grande Future Roadway Classification Plan.

Minor Arterial: This typical section is generally a four-lane and sometimes a two-lane roadway. Its purpose is to serve regional/sub-regional traffic circulation needs by moving traffic at moderate speeds while providing limited access to adjacent land. In the Casa Grande Future Functional Classification Plan, minor arterials are generally provided on the section line grid between the Principal Arterials.

Major Collector: This facility provides for shorter distance trips, generally less than three miles, and primarily serves to collect and distribute traffic between key traffic generators, local streets and arterial streets. This classification provides direct access to abutting land. In Casa Grande, Major Collectors are located in the central commercial and residential core.

Minor Collector: Minor Collectors serve shorter distance trips than the Major Collector, generally less than one mile. They provide direct access to adjacent land and collect and distribute traffic between key traffic generators, local streets and arterial streets. In Casa Grande, Minor Collectors are located in the central commercial and residential core.

Local Streets: The primary purpose of this roadway type is to serve residences and provide circulation to commercial, industrial, or other adjacent land.

Rural: This cross-section functions similarly to a local street, but in less densely developed areas. It typically includes cut ditches on each side to convey drainage.

7.2 ROADWAY DESIGN STANDARDS

The roadway design standards from the previous Casa Grande transportation plan have been carried forward to this study update. The following descriptions of roadway design criteria by functional classification as shown below were derived from the 2001 *Casa Grande Multimodal Transportation Study* prepared by Lima & Associates.

7.2.1 EXPRESSWAY

Travel demand forecasts show a clear need for a expressway loop system around Casa Grande. As shown in Figure 7-1, an expressway has six general purpose travel lanes constructed on 300 feet of right-of-way. Each travel direction includes three 12-foot lanes, a 10-foot outside shoulder, and an 8-foot inside shoulder. Typically, a 30-foot median separates opposing traffic flows.

An expressway does not provide access to abutting land nor on-street parking. Access is limited to traffic signals located at a minimum of one-mile spacing. Grade-separated traffic interchanges may be constructed at high volume locations.

7.2.2 PRINCIPAL ARTERIAL

A principal arterial, as shown in Figure 7-2, has six travel lanes with either a raised median or a center two-way left turn lane. A bike lane is included in the cross-section. The cross-section is constructed on 140 feet of right-of-way.

Access to principal arterial streets is limited to intersections at quarter-mile spacing and to driveways of major developments, such as large commercial, industrial, or office complexes, or master-planned communities. On-street parking is not allowed.

7.2.3 MINOR ARTERIAL

A minor arterial, shown in Figure 7-3, has four travel lanes constructed on 110 feet of right-of-way. The travel lanes are divided by either a two-way left turn lane or a raised median. A bike lane is included in the cross-section.

Access to minor arterial streets is limited to intersections at quarter-mile spacing and to driveways of major developments, such as large commercial, industrial, or office complexes, or master-planned communities. On-street parking is not allowed.

7.2.4 MAJOR COLLECTOR

A major collector is two travel lanes constructed on 80 feet of right-of-way. As shown in Figure 7-4, opposing travel directions are separated by a two-way left turn lane or a raised median. A bike lane is included in the cross-section.

Access to major collector streets is limited to intersections at eighth-mile spacing and to driveways to adjacent developments. All vehicles entering the traffic stream must be driving forward; no backing into traffic is allowed. On-street parking is not allowed.

An alternative cross-section for a major collector street includes four traffic lanes. Neither a two-way left turn lane nor bike lanes are included in the cross-section. The alternate major collector cross-section may be implemented under the following conditions:

- The street does not serve an area that is primarily developed with single family residential uses
- Forecast traffic volumes exceed 10,000 vehicles per day
- The street does not provide access to a school or to another facility, such as a private or public park, that generates a significant amount of bicycle traffic
- A multi-use path meeting AASHTO standards is readily available for bicycle useage in lieu of on-street bike lanes
- The cross-section used only in areas of established development (areas developed prior to year 2000)

In cases where all of the above conditions are not met and forecasted traffic volumes warrant additional travel lanes, the minor arterial cross-section should be utilized.

7.2.5 MINOR COLLECTOR

The minor collector cross-section, as shown in Figure 7-5, includes two travel lanes constructed on 60 feet of right-of-way. The 40-foot roadway consists of a 12-foot travel lane and a 6-foot bike lane in each direction. Access to minor collector streets should be restricted except for large contiguous lots.

7.2.6 LOCAL

Urban, Parking Allowed - Figure 7-6 shows a 32-foot, two-lane urban cross-section constructed on 44 feet of right-of-way with parking allowed on both sides of the street. Access to local streets is allowed from each parcel abutting the street.

Urban, Parking Not Allowed – Also shown on Figure 7-6, this two-lane 26-foot cross-section is built on 38 feet of right-of-way. On street parking is not allowed with this cross-section. Homeowners association enforcement and a 0.25-acre minimum lot size are required for this option.

Rural, Parking Not Allowed – This is a 24-foot roadway built on 40 feet of right-of-way with drainage ditches. A 1.25-acre minimum lot size is required. On-street parking is not allowed. This section is shown in Figure 7-6.

7.2.7 ALTERNATIVE LOCAL (SIDEWALK SEPARATION)

Urban, Parking Allowed - Figure 7-7 shows a 32-foot, two-lane urban cross-section constructed on 50 feet of right-of-way with parking allowed on both sides of the street. This street section provides a typical 5-foot separation between back-of-curb and sidewalk. Access to local streets is allowed from each parcel abutting the street.

Urban, Parking Not Allowed – Also shown on Figure 7-7, this two-lane 26-foot cross-section is built on 44 feet of right-of-way. On street parking is not allowed with this cross-section. This street section provides a typical 5-foot separation between back-of-curb and sidewalk.

7.2.8 INTERSECTION FLARE

An additional 20-foot-by-150-foot parcel of right-of-way should be obtained on each approach at all principal arterial/principal arterial, principal arterial/minor arterial, and major collector/arterial intersections to accommodate turn lanes.

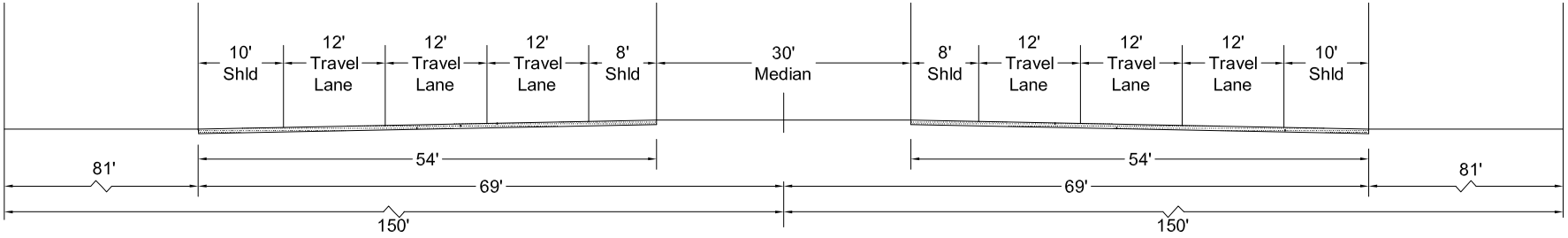
Design standards for the six functional classifications: expressway, principal arterial, minor arterial, major collector, minor collector, and local are summarized in Table 7-1.

TABLE 7-1
ROADWAY DESIGN CRITERIA

Criteria	Functional Classification				
	Expressway	**Principal Arterial**	**Minor Arterial**	**Major Collector**	**Minor Collector**
Right-of-Way Width	300'	140'	110'	80'	60'
Street Width (to back of curb	138'	102'	74'	50'	36'
Pavement Width	2 x 54'	2 x 42'	70'	46'	32'
Edge Treatment	Shoulders	Vertical Curb	Vertical Curb	Vertical Curb	Vertical Curb
Sidewalk (both sides)	None	6'	6'	5'	5'
Design Speed	75 mph	55 mph	45 mph	40 mph	35 mph
Speed Limit	55 mph	40 mph	35 mph	35 mph	25 mph
Design ADT	120,000	45,000	30,000	10,000	8,000
Street Purpose	Mobility	Mobility	Mobility	Access/Mobility	Access
Parking	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Property Access	None	Major Driveway Only	Major Driveway Only	Individual Driveway Head Out	Restricted
Criteria	**Functional Classification**				
	Local			**Alternative Local (Sidewalk Separation)**	
	Urban (1)	**Urban (2)**	**Rural**	**Urban (1)**	**Urban (2)**
Right-of-Way Width	44'	38'	40'	50'	44'
Street Width (to back of curb)	32'	26'	24'	32'	26'
Pavement Width	28'	22'	24'	28'	22'
Edge Treatment	Roll Curb/ Vertical Curb	Roll Curb/ Vertical Curb	Shoulder/ Drainage Ditch	Roll Curb/ Vertical Curb	Roll Curb/Vertical Curb
Sidewalk (both sides)	4'	4'	None	4'	4'
Design Speed	30 mph	30 mph	30 mph	30 mph	30 mph
Speed Limit	25 mph	25 mph	25 mph	25 mph	25 mph
Design ADT	1,000	1,000	1,000	1,000	1,000
Street Purpose	Access	Access	Access	Access	Access
Parking	Allowed	Not Allowed	Not Allowed	Allowed	Not Allowed
Property Access	Individual Driveway Back Out Ok	Individual Driveway Back Out Ok	Individual Driveway Back Out Ok	Individual Driveway Back Out Ok	Individual Driveway Back Out Ok

Source: Casa Grande Multimodal Transportation Study, Lima & Associates, 2001.

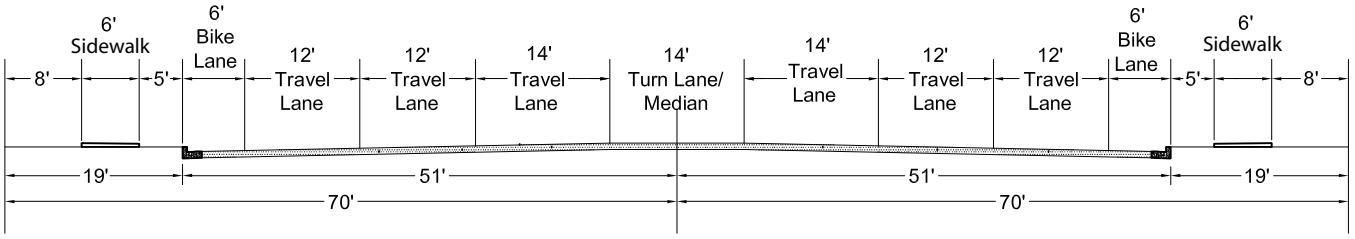
Notes: Minimum half-street requirement is 24-feet pavement width.
Maximum Cul-de-sac length in 600 feet.



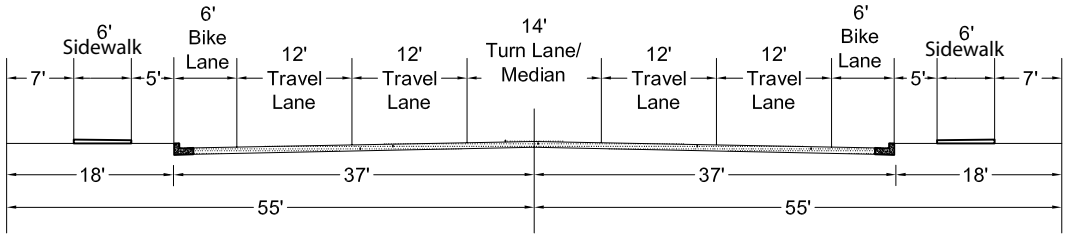
CITY OF CASA GRANDE

EXPRESSWAY
TYPICAL SECTION

FIGURE 7-1



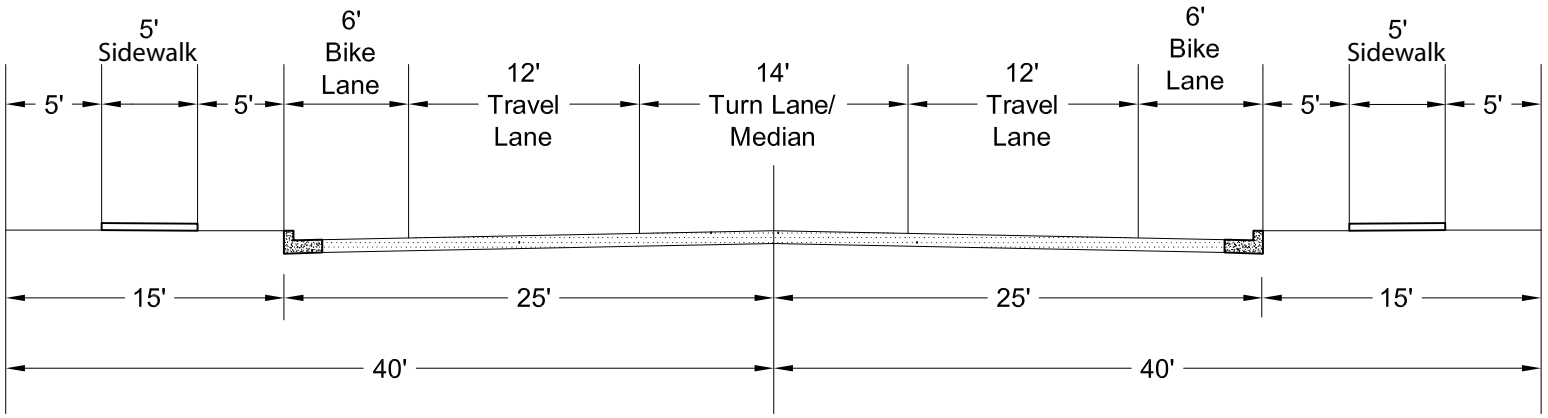
	CITY OF CASA GRANDE	PRINCIPLE ARTERIAL TYPICAL SECTION	FIGURE 7-2



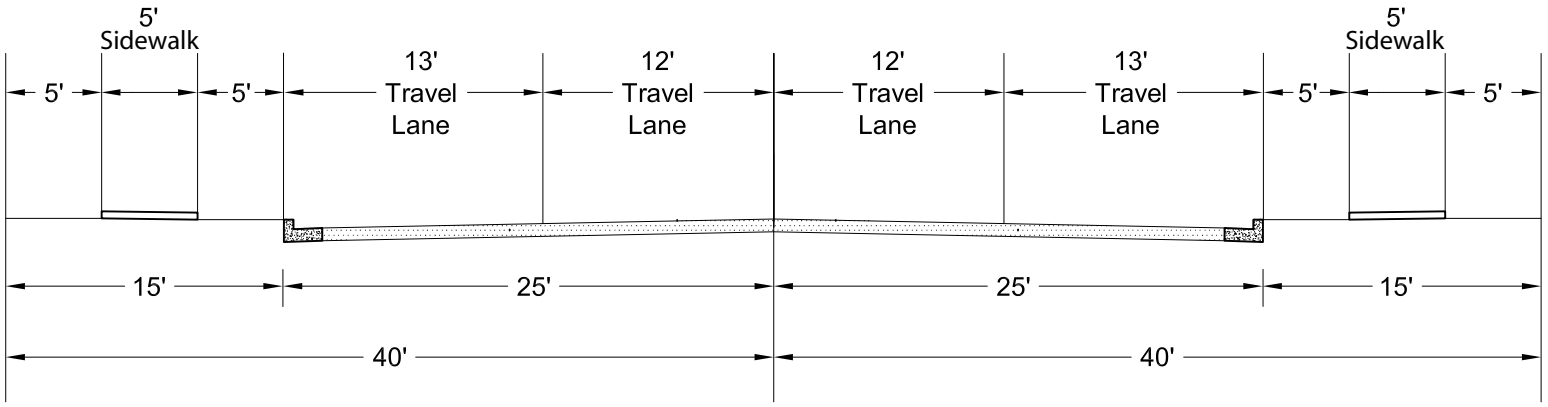
CITY OF CASA GRANDE

MINOR ARTERIAL
TYPICAL SECTION

FIGURE 7-3



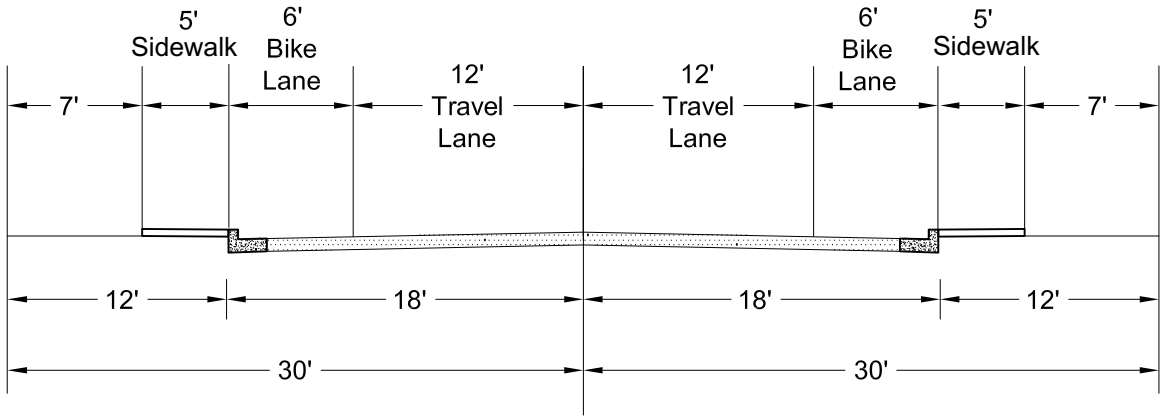
ALTERNATE



CITY OF CASA GRANDE

MAJOR COLLECTOR
TYPICAL SECTION

FIGURE 7-4

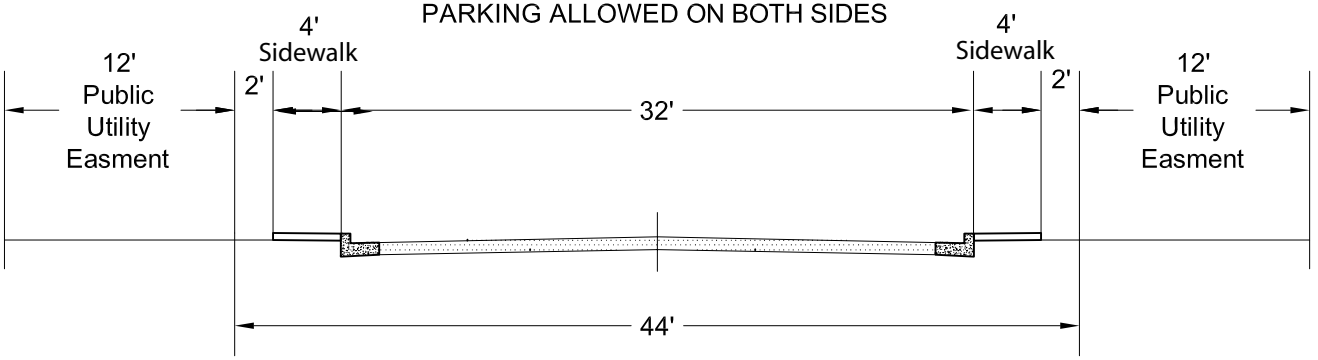


CITY OF CASA GRANDE

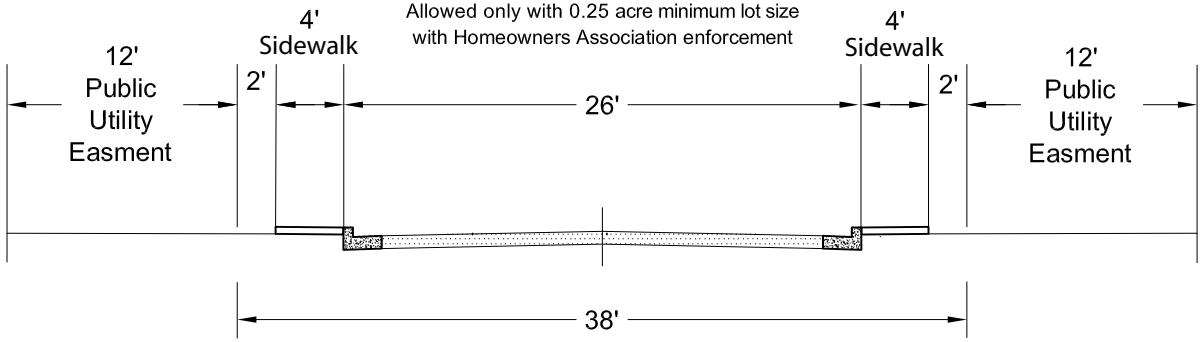
MINOR COLLECTOR
TYPICAL SECTION

FIGURE 7-5

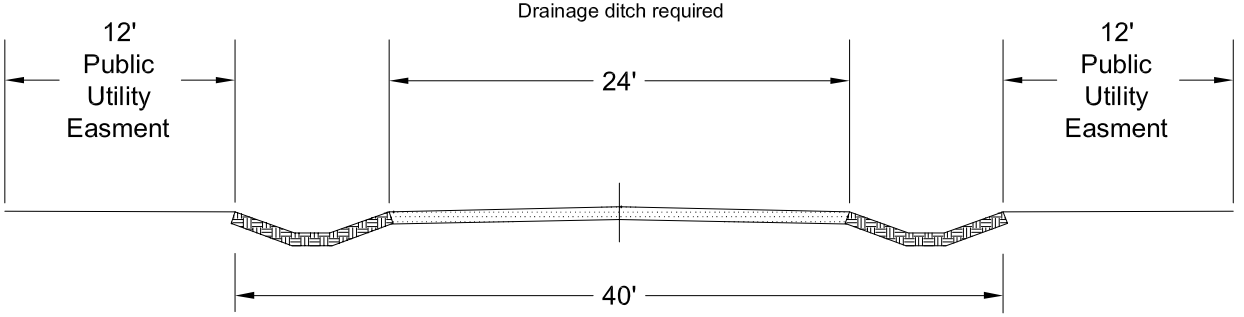
URBAN CROSS-SECTION (1)
PARKING ALLOWED ON BOTH SIDES



URBAN CROSS-SECTION (2)
PARKING NOT ALLOWED
Allowed only with 0.25 acre minimum lot size
with Homeowners Association enforcement



RURAL SECTION
PARKING NOT ALLOWED
Allowed only with 1.25 acre minimun lot size
Drainage ditch required

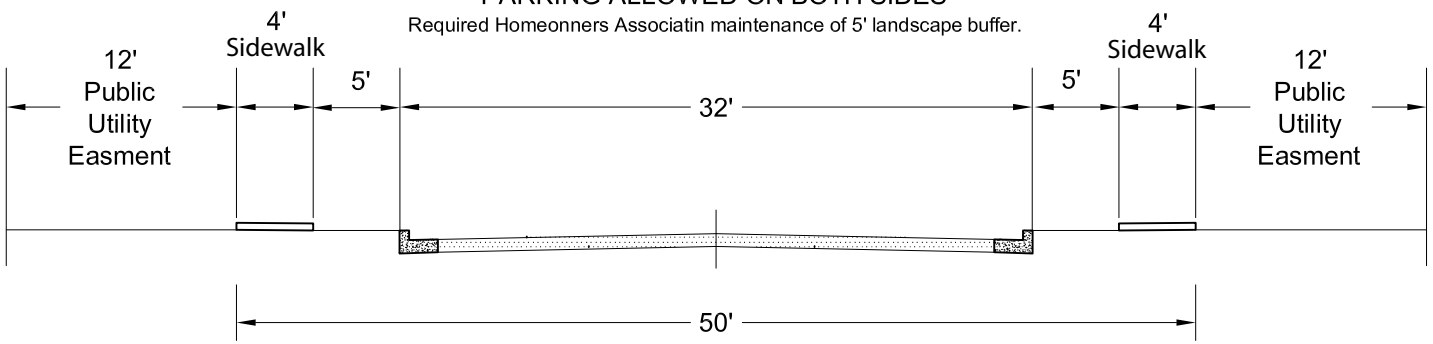


CITY OF CASA GRANDE

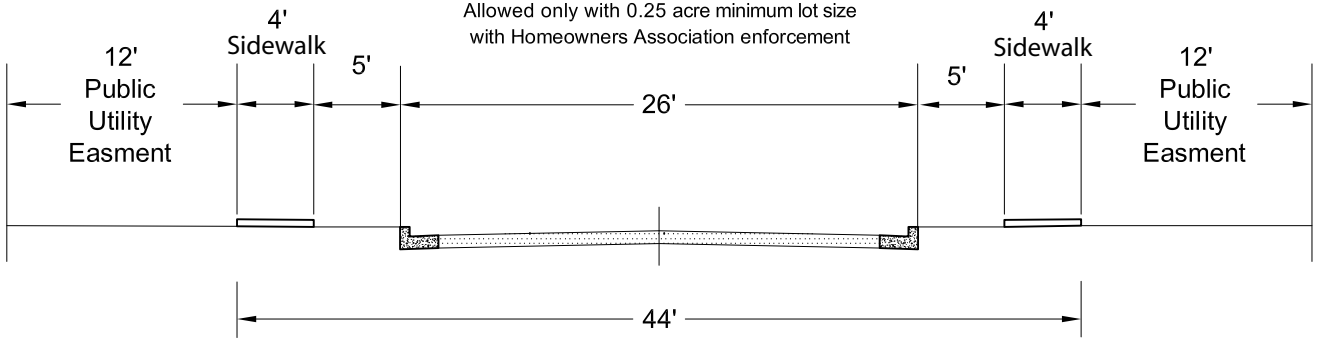
LOCAL STREET
TYPICAL SECTION

FIGURE 7-6

URBAN CROSS-SECTION (1)
PARKING ALLOWED ON BOTH SIDES
Required Homeonners Associatin maintenance of 5' landscape buffer.



URBAN CROSS-SECTION (2)
PARKING NOT ALLOWED
Allowed only with 0.25 acre minimum lot size
with Homeowners Association enforcement



	CITY OF CASA GRANDE	ALTERNATIVE LOCAL STREET TYPICAL SECTION	FIGURE 7-7

7.3 ACCESS MANAGMENT

Access management is a commonly used method to enhance roadway safety and mobility through planning, regulatory and design strategies. The Transportation Research Board (TRB) 2003 *Access Management Manual* defines access management as the "systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges and street connections to a roadway." The benefits of access management are far reaching, and at a minimum include motorists, pedestrians, cyclists, businesses and land owners. For agencies that are responsible for operating and maintaining the transportation system, implementing access management practices increase safety, decrease delays and maintain roadway capacity, thus protecting the transportation system investment.

To address access management issues on a statewide basis, ADOT is nearing the completion of a study to develop a Statewide Access Management Plan. When complete, this plan will contain specific access management strategies and recommendations for all state facilities based on the roadways functional classification.

The access control guidelines from the 2001 *Casa Grande Multimodal Transportation Study* are presented in Appendix C.

7.4 TRAFFIC IMPACT ANALYSIS PROCEDURES

Uniform guidelines for preparing Traffic Impact Analyses (TIA) for new developments are important for the both the developer and the City of Casa Grande. These procedures provide the information needed to provide a balance between land use and transportation infrastructure needs. For developments with traffic impacts only on the City of Casa Grande roadway network, TIA guidelines from the 2001 *Casa Grande Multimodal Transportation Study,* which are included in Appendix D, should be utilized. For developments with traffic impacts on state-owned roadways, the ADOT TIA guidelines should utilized. These guidelines are available at http://www.azdot.gov/highways/traffic/PGP.asp.

APPENDIX A
SUMMARY OF PUBLIC COMMENT

To take the community's pulse on transportation-related issues, interviews were conducted with six Casa Grande area transportation stakeholders. These stakeholders included:

- The Casa Grande Dispatch newspaper
- The Greater Casa Grande Chamber of Commerce
- The elementary and high school district superintendents
- The Homebuilders Association of Central Arizona
- A Casa Grande bicycle advocate

These interviews focused on six key topics related to important transportation issues:

- Near- and long-term transportation related issues that face the Casa Grande Community
- Priority transportation circulation system improvements
- Impact of truck activity on the community
- Safety concerns related to the implementation of access management policies
- Potential enhancements to mobility from new transit service
- Significant safety issues in the city

All stakeholders identified needs for additional transportation improvements to accommodate growth in the region. Recommendations included new access to I-10, a downtown bypass for trucks, an improved arterial grid system, bus transit service, and closing the gaps in the network of bicycle lanes. A summary of each stakeholder's concerns is shown by transportation issue Table A-1

While several stakeholders expressed concern about operating conditions on I-10 and other state-owned facilities, it should be noted that the purpose of this study is only to provide detailed recommendations for improvements on local roadways.

TABLE A-1
TRANSPORTATION STAKEHOLDER INTERVIEW SUMMARY

Stakeholder	Issues/Concerns					
	Near- and Long-Term Transportation-Related Issues	**Priority Circulation System Improvements**	**Impact of Truck Activity**	**Access Management**	**Transit Service**	**Safety Issues**
Mr. Donovan Kramer, Jr. Managing Editor Casa Grande Dispatch	• Florence Boulevard congestion a problem • Need for I-10/Kortsen Road Interchange • Need to widen I-10 between Casa Grande and Phoenix	• Use Montgomery Road to create freeway loop around city	• Trucks cut through the city to access the Wal-Mart Distribution Center • City truck routes should be enforced	• Proposed median on Florence Boulevard too controversial due to business concerns about restricted access • Medians proposed for Cottonwood Lane planned widening	• Transit service needed to improve mobility • Bike routes also need to be improved • Committee exploring link to Arizona trails	• Florence Boulevard at I-10 is site of several fatal crashes • Lower speed limits, better enforcement, more traffic signals needed
Ms. Helen Neuharth Greater Casa Grande Chamber of Commerce	• Need for public transportation • Need for alternative corridors to Florence Boulevard and Pinal Avenue	• Alternative corridors to Florence Boulevard and Pinal Avenue needed	• Need to designate truck corridor to route Wal-Mart distribution center traffic away from downtown.	• Consistent application of access management policy needed	• Public transit needed to satisfy retired/elderly mobility needs	• Speed limits on Florence Boulevard and Pinal Avenue • Improvement of I-10 interchanges • Widen I-10 to outside to preserve median for safety
Ms. Nancy Pifer Superintendent of Schools Casa Grande Union High School District	• Need to enhance grid system • More north-south, east-west arterial capacity needed • Muddy roads an issue for school buses	• Need for enhancing the east-west, north-south arterial grid	• No concern noted	• No concern noted	• Monorail between Casa Grande and Phoenix would help relieve I-10 congestion	• No concern
Mr. Frank Davidson Superintendent of School Casa Grande Elementary School District	• Arterial system overwhelmed by seasonal traffic • Need for additional I-10 Access	• Need to widen Florence Boulevard east of I-10 • Need to widen Kortsen Road west of town	• Truck activity on increasingly residential Pinal Avenue and Kortsen Road a potential concern	• Narrow lane widths create problems for large school buses	• Transit service would benefit large low-income population	• Congestion at schools on East Kortsen Road • No median opening at Ghost Ranch access to Pinal Avenue
Ms. Rachel Aja Homebuilders Association of Central Arizona	• Interchanges along I-10 (Val Vista most important) • Need to widen I-10 • Montgomery connection needed from I-10 to I-8 • Burris alignment needed to improve circulation near airport • Additional point of entry needed besides I-10	• Additional point of entry besides I-10 needed	• Truck traffic impedes flow along two-lane I-10 • Montgomery connection between I-10 and I-8 would provide relief	• No concern noted	• No concern noted	• No concern noted
Mr. Kent Taylor Bicycle Advocate	• Need to emphasize alternative modes • Need to close gaps in bike network connectivity	• Need to encourage alternative modes • Need to emphasize north-south connectivity	• Need to provide continuous bike lanes to reduce potential conflicts with trucks	• Better application of access management policy needed	• Transit service to hospital, industrial centers, airport, and Florence Blvd needed	• Numerous curb cuts and access points • Lack of wide, paved shoulders or dedicated bike lanes

Source: Wilson & Company, 2007

Public Involvement Process

City of Casa Grande
Small Area Transportation Study

(Project Number: X5-310-012)

Report No. 1

Prepared for:

City of Casa Grande
510 E. Florence Blvd.
Casa Grande, AZ 85222

Prepared by:

WILSON &COMPANY

9633 South 48th Street, Suite 290
Phoenix, AZ 85044

And

Stantec
8211 South 48th Street
Phoenix, Arizona 85044

September 8, 2006

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1.0 OVERVIEW

The Casa Grande SATS is evaluating transportation needs for a 260-square mile study area that corresponds to the Casa Grande Planning Area. The primary objective of this SATS is to develop a transportation plan for the planning area that will guide multi-modal planning and programming on local roads over a 24-year timeframe.

Public involvement is a key part of the Casa Grande Small Area Transportation Study (SATS). The public involvement process is the conduit between study project team, Casa Grande stakeholders, and residents to exchange information on transportation issues, solutions, including study findings and recommendations.

The study Work Plan outlines two phases of public involvement. The first phase focuses on public scoping and issue identification. The purpose of the second phase of public involvement is to report back to the public to verify that the public issues and concerns have been addressed by the planning effort.

Public outreach and communication for this SATS is accomplished in several ways. The first is a Technical Advisory Committee that includes representatives from the cities of Casa Grande and Maricopa, Pinal County, ADOT, Central Arizona Association of Governments (CAAG), and the general public. In addition, public input on perceived transportation problems and issues is solicited through public meetings. The plan for communicating, informing and soliciting input from the TAC, stakeholders and the general public is set forth in the Public Involvement Plan (PIP), shown in Appendix A.

2.0 INTRODUCTION

This Public Involvement Summary Report documents the findings and issues from first phase of public involvement of the City of Casa Grande Small Area Transportation Study (SATS). The focus of this first phase of public outreach was a Public Open House. The purpose of this open house was threefold:

- Educate the public about the project;
- Acquire meaningful input; and,
- Inform the public about how their input will be reflected in the final product.

This document provides an overview of the first public open house. It presents a summary of public comment and outlines next public involvement steps and opportunities.

3.0 PUBLIC OPEN HOUSE

To introduce the Small Area Transportation Study to Casa Grande stakeholders and residents and solicit public input, a public open house was held on Monday, December 12, 2005, in the Casa Grande City Council Chambers. Eighteen residents and stakeholders signed the attendance sheet. The project was also presented to the Casa Grande City Council at a subsequent council work session on the same date.

The public open house and city council presentation included a newsletter and display boards that summarized the study purpose and key steps. The presentation materials also provided an overview of current conditions, including year 2005 population and employment estimates and study area roadway characteristics. Open house presentation materials are presented in Appendix B.

This public involvement opportunity was publicized both through the Casa Grande Dispatch City Page and the City of Casa Grande website. An announcement was run in the Casa Grande Dispatch City Page on November 21, 2005. On December 10, 2005, the Casa Grande Dispatch published an article on the upcoming open house. The City of Casa Grande press release announcing the open house can be found in Appendix C.

4.0 SUMMARY OF COMMENT

Public and stakeholder comments from this and other public involvement activities include:

- Ensure that the study population and employment forecasts are high enough to account for anticipated growth over the 20-year planning horizon
- Include consideration of a viable, dependable transit option to serve Valley commuters choosing to live in Casa Grande.
- There is a lack of system connectivity between collector streets which forces more traffic onto arterials.
- Access management is an important concern on arterial streets. Consistent application of access management strategies should be implemented to protect the City's investment in transportation infrastructure.
- A Montgomery Road connection is needed between I-8 and I-10 to provide relief to I-10, Pinal Avenue, and Maricopa-Casa Grande Highway.
- The Burris Road alignment is needed to improve circulation near the Casa Grande Airport.

5.0 NEXT STEPS

The second phase of public involvement will report back to the public on future deficiencies and proposed improvements. This second public open house will seek to obtain further feedback and comment from the public. Improvement recommendations will be refined based on this public feedback. Next, a last meeting with the City Council will be held to present the final, refined improvement recommendations. Findings and issues from this second round of public involvement activities will be documented in a subsequent Public Involvement Summary Report.

Public Involvement Process

City of Casa Grande
Small Area Transportation Study

(Project Number: X5-310-012)

Report No. 2

Prepared for:

City of Casa Grande
510 E. Florence Blvd.
Casa Grande, AZ 85222

Prepared by:

9633 South 48th Street, Suite 290
Phoenix, AZ 85044

And

Stantec
8211 South 48th Street
Phoenix, Arizona 85044

February 9, 2007

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1.0 OVERVIEW

The Casa Grande SATS is evaluating transportation needs for a 260-square mile study area that corresponds to the Casa Grande Planning Area. The primary objective of this SATS is to develop a transportation plan for the planning area that will guide multi-modal planning and programming on local roads over a 24-year timeframe.

Public involvement is a key part of the Casa Grande Small Area Transportation Study (SATS). The public involvement process is the conduit between study project team, Casa Grande stakeholders, and residents to exchange information on transportation issues, solutions, including study findings and recommendations.

The study Work Plan outlines two phases of public involvement. The first phase focused on public scoping and issue identification. The purpose of the second phase of public involvement is to report back to the public to verify that the public issues and concerns have been addressed by the planning effort.

Public outreach and communication for this SATS is accomplished in several ways. The first is a Technical Advisory Committee that includes representatives from the cities of Casa Grande and Maricopa, Pinal County, ADOT, Central Arizona Association of Governments (CAAG), and the general public. In addition, public input on perceived transportation problems and issues is solicited through public meetings.

2.0 INTRODUCTION

The first public open house was held in December, 2005. The purpose of the first phase of public involvement was to introduce the project to the public, acquire feedback on key transportation issues and concerns, and explain how any input would be reflected in the final product.

This Public Involvement Summary Report documents the findings and issues from second phase of public involvement of the City of Casa Grande Small Area Transportation Study (SATS). The focus of this second phase of public outreach was a Public Open House. The purpose of this open house was to present the study findings and recommendation and acquire public feedback on the roadway system improvement recommendations.

This document provides an overview of the second public open house and presents a summary of public comment.

3.0 PUBLIC OPEN HOUSE

The second open house was held on Monday, November 20, 2006. It presented long range transportation system improvement recommendations to the public and solicit feedback. Twelve residents and stakeholders signed the attendance sheet. The project was also presented to the Casa Grande City Council at a subsequent council work session on the same date.

The public open house and city council presentation included a newsletter and display boards that summarized the key study findings and recommendations. The presentation materials also provided an overview of population and employment projections, including year 2030 population and employment estimates and study area roadway characteristics. Open house presentation materials are presented in Appendix A. This public involvement

opportunity was publicized both through the Casa Grande Dispatch City Page and the City of Casa Grande website.

4.0 SUMMARY OF COMMENT

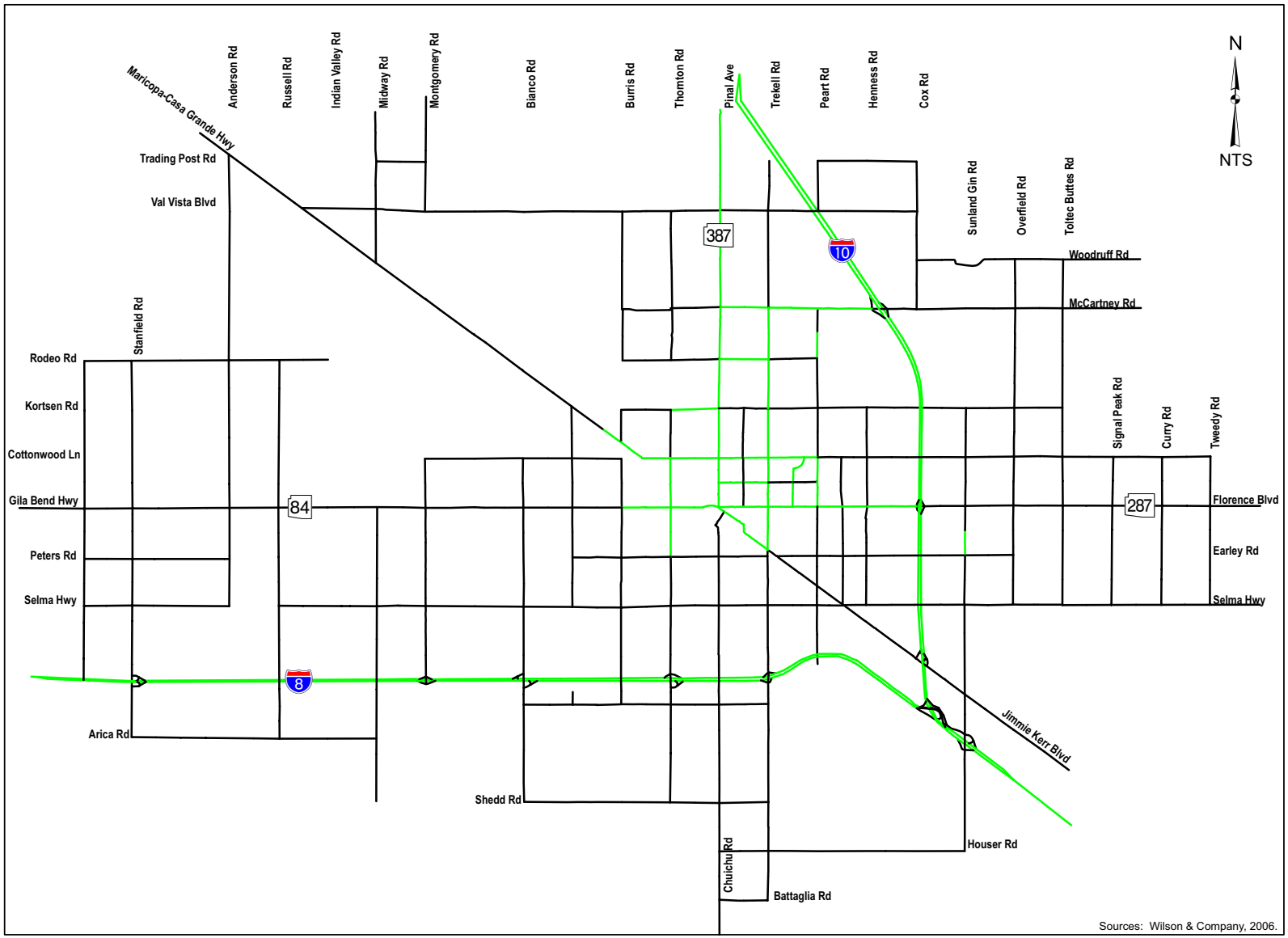
Public and stakeholder comments from this and other public involvement activities include:

- ADOT should work to improve the commute between Phoenix and Casa Grande through additional capacity on I-10.
- Alternative funding mechanisms, such as tolling, could be part of the funding matrix for some roadway infrastructure improvements.
- Recommendations of this Small Area Transportation Study should be coordinated with other regional and sub-regional transportation and land use studies.
- Heavy truck impacts should be mitigated in sensitive residential and commercial areas in Casa Grande's central core.
- Ensure connectivity of the bicycle routes and pedestrian sidewalks. Grade separated crossings should be considered at key crossing locations.

5.0 NEXT STEPS

Next, comments from the public and the City of Casa Grande will be incorporated into a final report that documents the study process and findings, including the public comment. The final report will be presented to the City Council for approval.

APPENDIX B
ROADWAY NETWORK NEEDS ASSESSMENT



YEAR 2010 E+C
NETWORK LANES

Legend

Directional Lanes

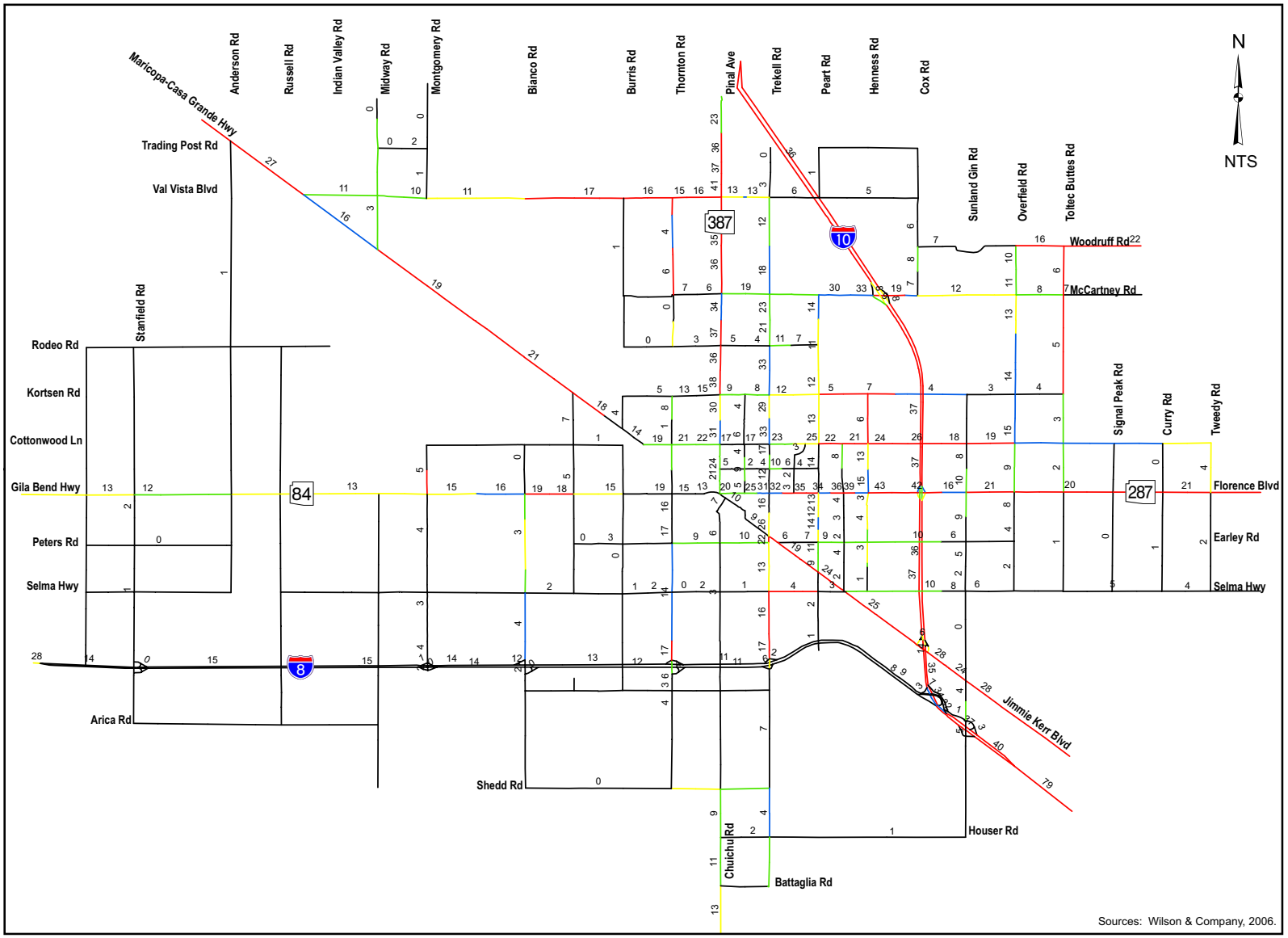
- 1
- 2
- 3
- 4

Note: These roadways do not account for all existing planned development, current roadway alignments, or vertical structures, and should not be construed as centerline or roadway alignments.

Sources: Wilson & Company, 2006.

FIGURE B-1

YEAR 2010 E+C NETWORK PERFORMANCE AND VOLUME ESTIMATE



Sources: Wilson & Company, 2006.

Level of Service

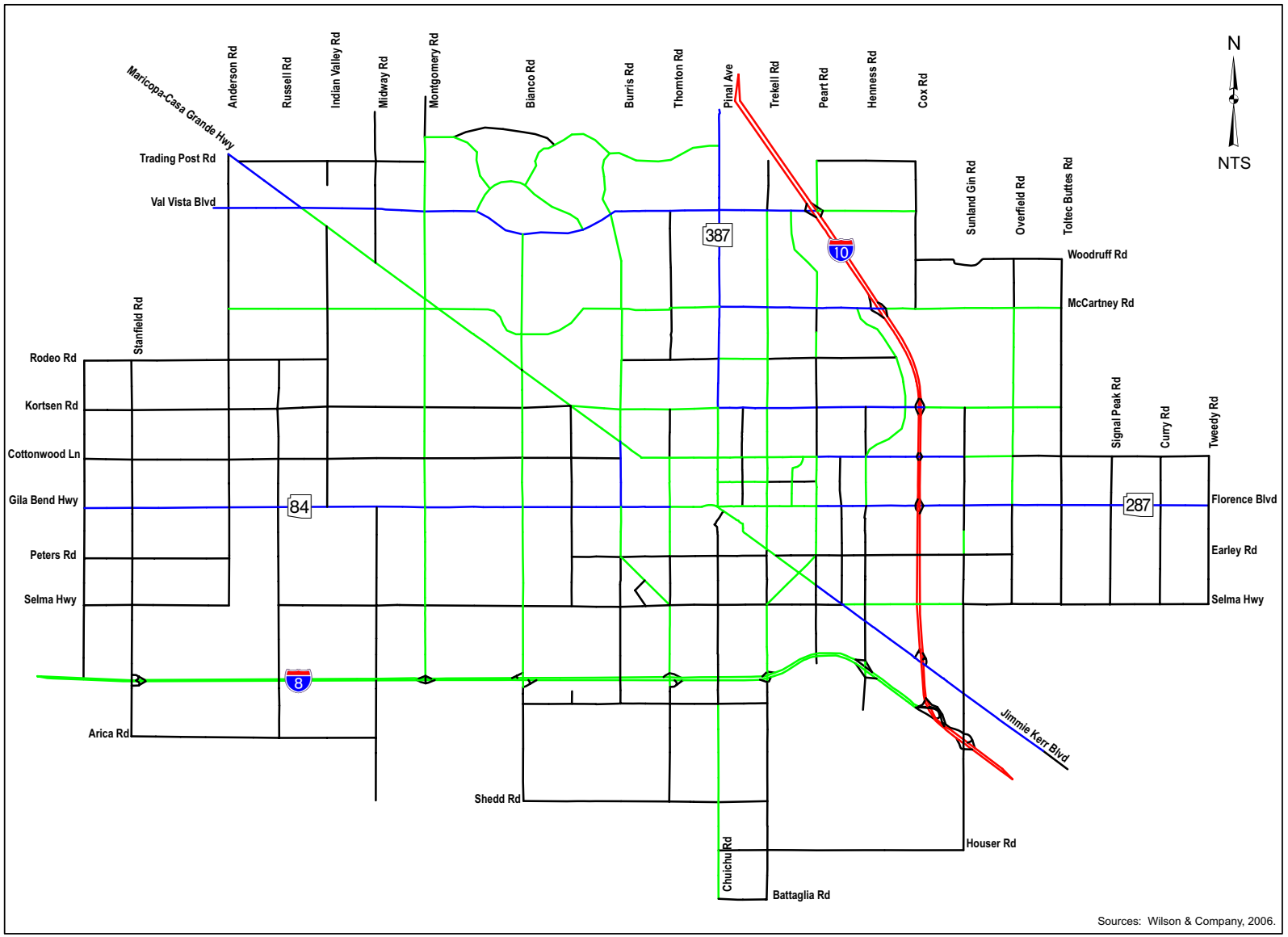
- LOS A - B
- LOS C
- LOS D
- LOS E
- LOS F

XX - Daily Volume Estimates (thousands)

Note: These roadways do not account for all existing planned development, current roadway alignments, or vertical structures, and should not be construed as centerline or roadway alignments.

FIGURE B-2

YEAR 2020 ROADWAY NEEDS NETWORK



Legend

Directional Lanes

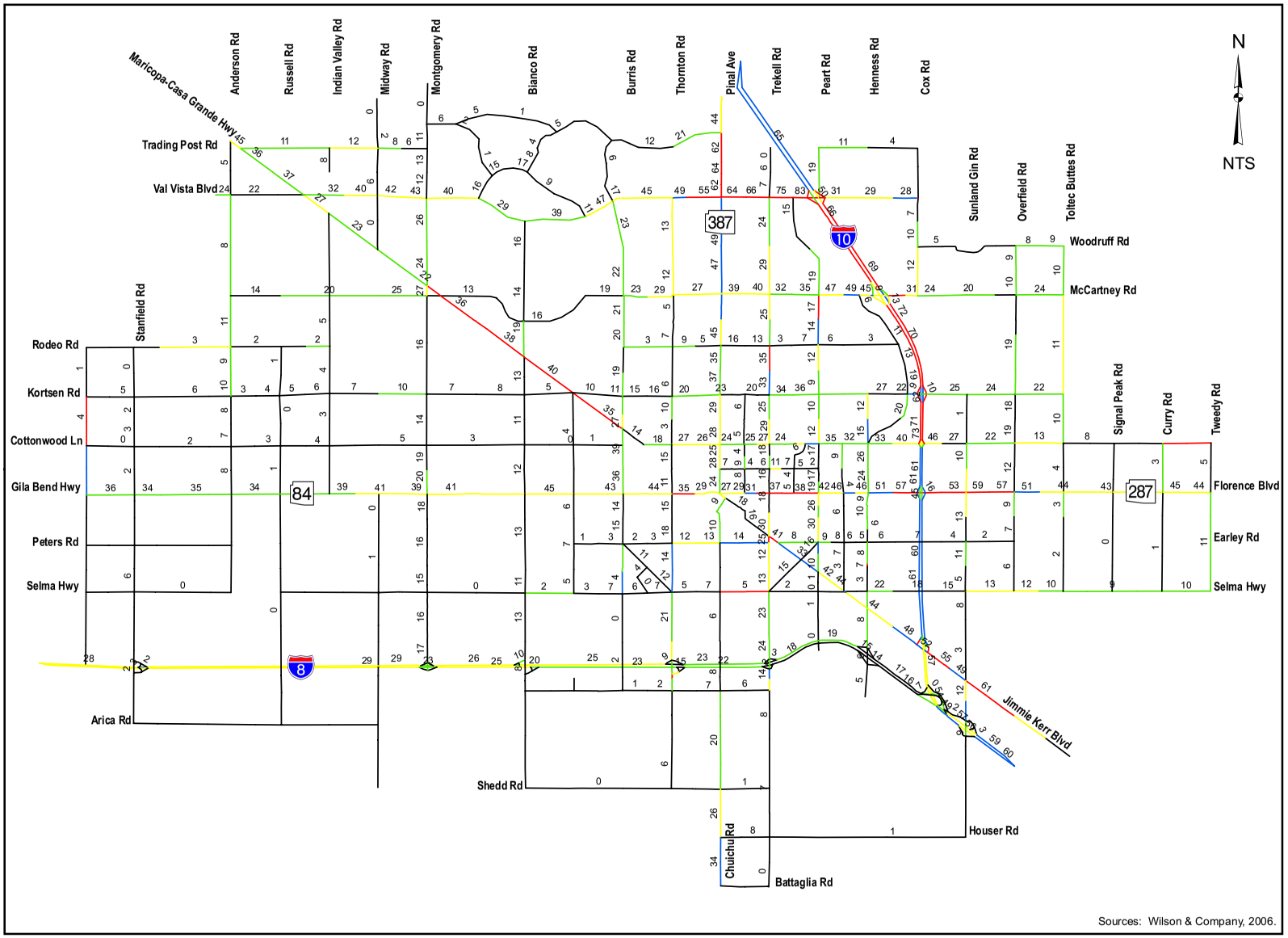
- 1
- 2
- 3
- 4

Note: These roadways do not account for all existing planned development, current roadway alignments, or vertical structures, and should not be construed as centerline or roadway alignments.

Sources: Wilson & Company, 2006.

FIGURE B-3

YEAR 2020 NEEDS NETWORK PERFORMANCE AND VOLUME ESTIMATES



Level of Service

- LOS A - B
- LOS C
- LOS D
- LOS E
- LOS F

XX - Daily Volume Estimates (thousands)

Note: These roadways do not account for all existing planned development, current roadway alignments, or vertical structures, and should not be construed as centerline or roadway alignments.

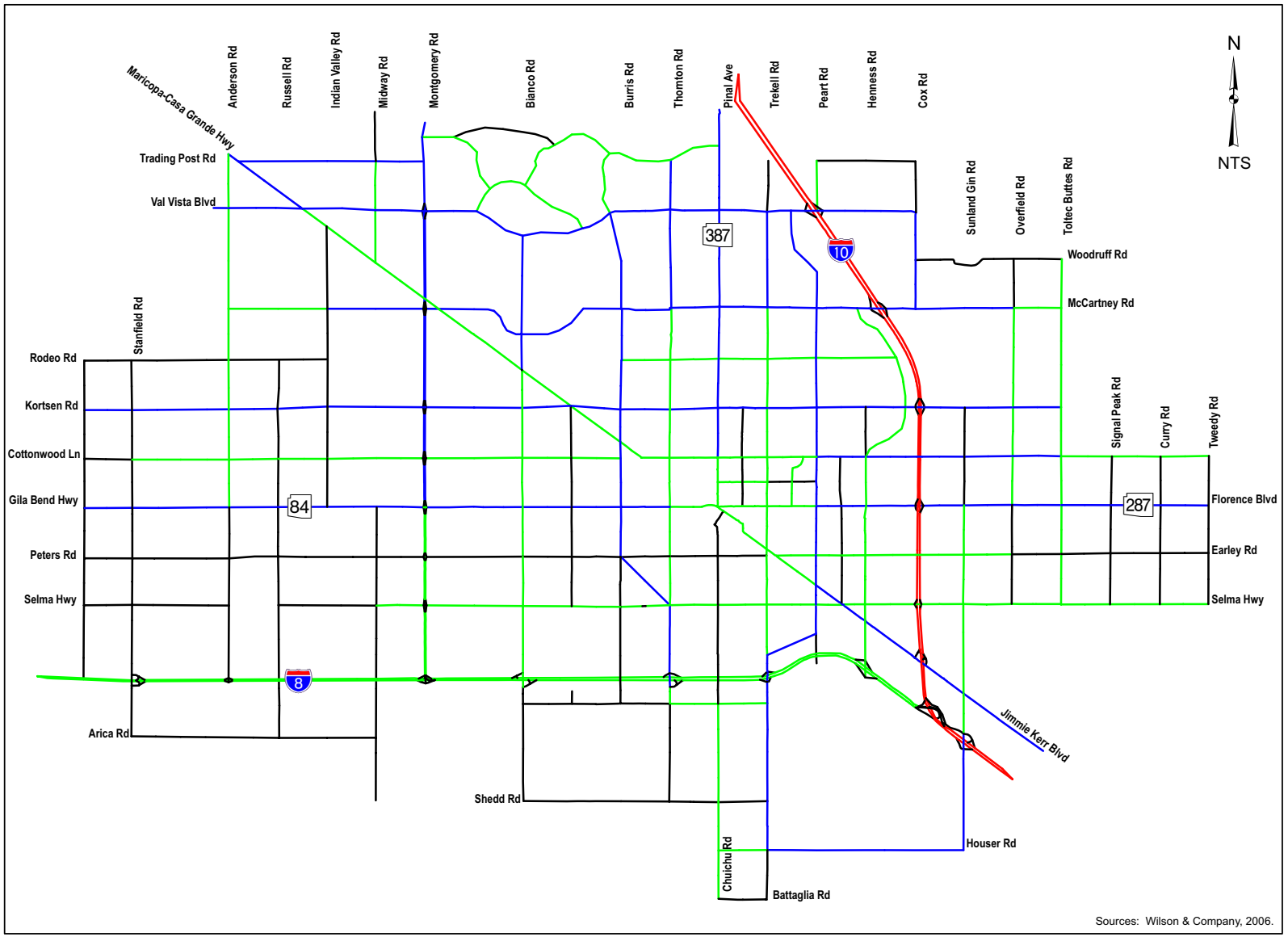
Sources: Wilson & Company, 2006.

FIGURE B-4

WILSON & COMPANY

2006 Casa Grande Small Area Transportation Study

YEAR 2030 ROADWAY NEEDS NETWORK

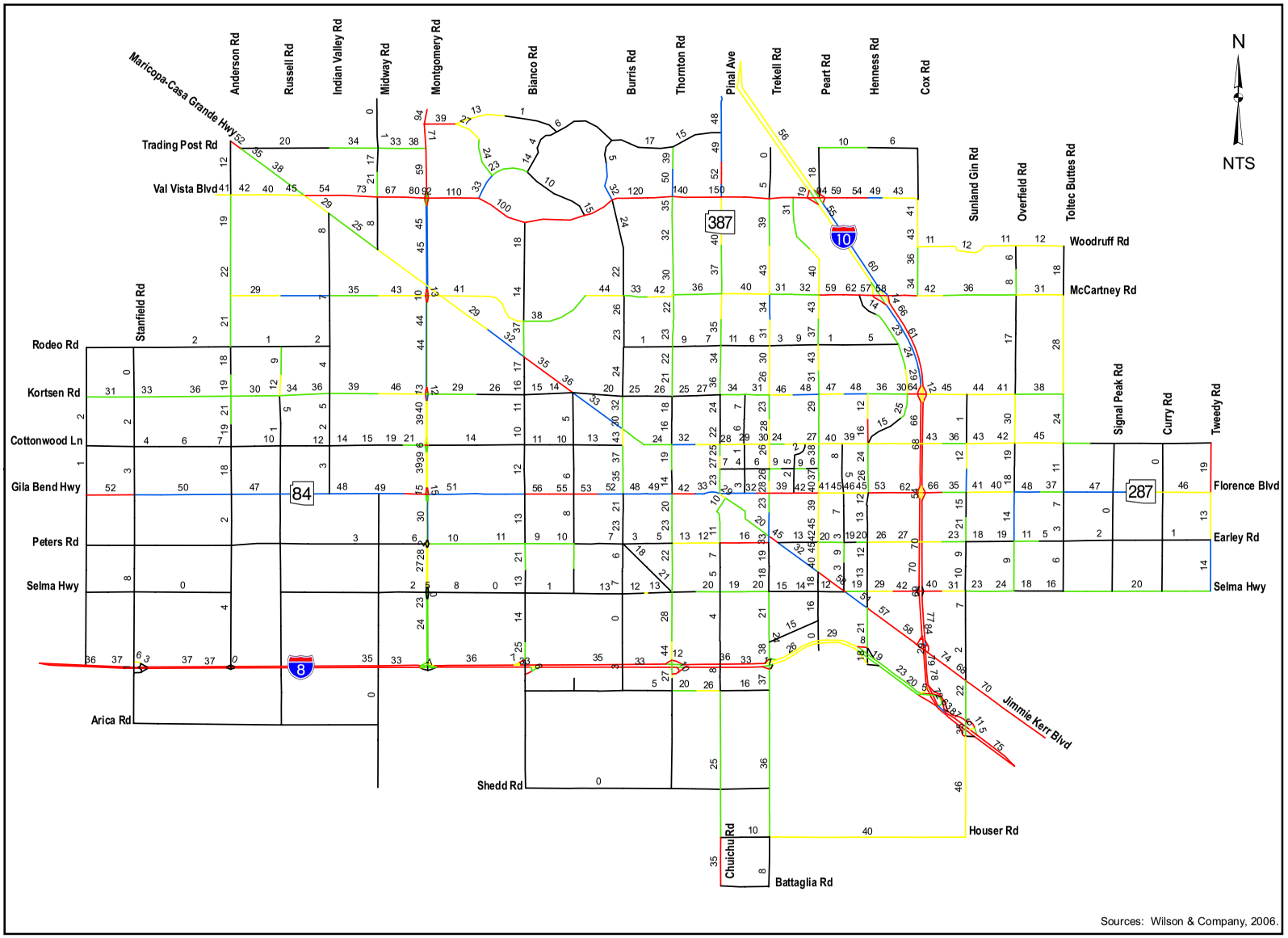


Sources: Wilson & Company, 2006.

Note: These roadways do not account for all existing planned development, current roadway alignments, or vertical structures, and should not be construed as centerline or roadway alignments.

FIGURE B-5

YEAR 2030 NEEDS NETWORK PERFORMANCE AND VOLUME ESTIMATES



Level of Service

- LOS A - B
- LOS C
- LOS D
- LOS E
- LOS F

XX - Daily Volume Estimates (thousands)

Note: These roadways do not account for all existing planned development, current roadway alignments, or vertical structures, and should not be construed as centerline or roadway alignments.

Sources: Wilson & Company, 2006.

FIGURE B-6

WILSON & COMPANY

2006 Casa Grande Small Area Transportation Study

APPENDIX C
2001 *CASA GRANDE MULTIMODAL TRANSPORTATION STUDY* ACCESS CONTROL GUIDELINES

8. ACCESS MANAGEMENT

The purpose of this chapter is to provide an overview of access management issues confronting the City and to provide recommended practices for the management of vehicular access to all City-owned roadways and state highways. Current access management practice in Casa Grande is provided in Appendix A. The Appendix includes access management material from Chapter 17.56, Off-Street Parking, of the *Casa Grande Municipal Code*.

DEFINITION OF ACCESS MANAGEMENT

Access management is defined as the regulation of vehicular access to public roadways from adjoining property. Access management is provided through legal, administrative, and technical strategies available to a political jurisdiction under its police powers in order to maintain the health, safety, and welfare of the jurisdiction's residents. Moreover, access management regulates the level of access control on roadways and is needed to help retain the capacity of public highways, access to private land, and maintain public safety.

Different types of roadways are administered by different entities such as the State, a municipality, or a county. The land use decisions made by the local jurisdiction that a roadway passes through influences the functionality of that particular roadway. An example is the functionality of SR 287 (Florence Boulevard), which is administered by ADOT. The functionality is very much dependent on the land use decisions made by Casa Grande. Therefore, all jurisdictions responsible for transportation systems and land use planning should be aware of this particular relationship and adopt formal access management guidelines. These may be published as a separate document, contained in zoning codes, established in roadway planning and development procedures, or in some combination. The implementation of the guidelines or regulations should be a shared responsibility of both the planning and engineering departments. The regulations should be approved by the jurisdiction's elected body and be readily available for use by developers, real estate agents, and the general public.

The guidelines presented in this chapter provide basic design criteria for the location, spacing, and geometric aspects of driveways. The guidelines are intended for use in investment decisions by land developers, for site planning, and for facility design. Availability of the guidelines reduces project review and approval time, as well as assuring that adequate access is available to serve a proposed land use.

LEGAL ISSUES OF ACCESS CONTROL

This section presents an overview of legal issues in regard to access control. The discussion is based on a review of Arizona Revised Statues and on a 1990 ADOT report entitled *Access Management: Practices in Other States and Improvement for Arizona*.

Access rights are property rights protected by the U.S. Constitution as well as the Arizona State Constitution. According to the Arizona Constitution (Article 2, Section 17) "no property shall be taken or damaged for public or private use without just compensation...." An owner of a property abutting a public highway has a private right or easement for the purpose of ingress and egress to and from his property. This easement may not be taken or substantially impaired without compensation. However property right of access is not an absolute right and is subject to the public's right of passage.

All private property rights, including access rights, are susceptible to condemnation through the State's power of eminent domain. Access rights are also always subject to reasonable regulation through police powers of local governments and the state for the public health, safety, and welfare. The right of access is a right of reasonable access and is not a private right of direct access. However, once a direct access has been provided to a non-controlled access highway the property owner has an access easement. Any destruction or unreasonable restriction of that access requires compensation. The landowner must retain reasonable access which is access suitable for the highest and best use of the property.

Local governments and the state has the power to regulate traffic on the highway including the following:

- curbing highways and restricting driveway location, spacing, size, and design
- regulating traffic flow
- determining the types of vehicles that may use a highway
- restricting traffic movement to one direction of travel
- striping a highway or constructing a median divider which permanently limits property ingress and egress to one direction of travel

Local governments and the state may close direct access to a property and provide alternative indirect access via a frontage road or another public road abutting the property. If the indirect access provides reasonable access for the highest and best use of the property, the owner is not entitled to damages. Also, the property owner is not necessarily due compensation even if the access is more circuitous unless the property owner suffers a unique injury.

AUTHORITY TO CONTROL ACCESS ALONG STATE ROUTES

The director of ADOT is given the authority to exercise powers and duties as are necessary to fully carry out the policies, activities and duties of the transportation department. The director exercises complete and exclusive operational control and jurisdiction over the use of state highways and routes and prescribes rules as are necessary for public safety and convenience. The director has the authority to coordinate the design, right-of-way

purchase and construction of controlled-access highways, and related grade separations of controlled-access highways, and the extension and widening of arterial streets and highways (ARS 28-108).

Access control can be categorized as either full access control or partial access control. Full access control means that properties abutting a highway do not have direct access to the highway and that access is provided only at grade separated interchanges. A freeway is an example of a full access control highway with access provided only at grade separated interchanges. Full access control is implemented by the designation of a controlled-access highway by the State Transportation Board. Partial access control permits some crossing at grade and some private driveway connections. Uncontrolled access means that all abutting properties can have direct access to the highway. The current authority for partial access control is through ADOT administrative rule, Rule R17-3-712, *Encroachments in Highway Rights-of-way*. Other methods to control access along a highway include subdivision approval and site plan review through local government ordinance.

Arizona's Rule R17-3-712

On uncontrolled-access highways, ADOT controls access on state highways by administrative rule. *Rule R17-3-712, Encroachments in Highway Rights-of-way* guides the granting of encroachment permits. Permits for driveways onto a state highway are granted by ADOT's Engineering Districts in accordance with Rule R17-3-712.

EFFECTIVENESS OF ACCESS CONTROL

The effectiveness of access control measures has been reported in a report, *Access Management Awareness Program: Phase II Report*, December 1997, Iowa State University. The following findings were reported in regard to access control:

- Access management may be expected to lead to a reduction in annual accidents of 10 and 65 percent.
- Access management raised the level of traffic service to motorist at peak hour along a corridor by one level.
- Access management projects generally do not have an adverse effect on the majority of businesses.
- Ninety to 100 percent of motorists surveyed had a favorable opinion of improvements made to roadways that involve access management.

METHODS TO CONTROL ACCESS

Access can be controlled through the use of planning and regulatory tools and through the implementation of technical methods.

PLANNING AND REGULATORY TOOLS

The following are planning and regulatory tools that are available to the City to control access to properties.

1. Land Division. Controlling lot dimensions has an impact on driveway spacing, on-site circulation, and driveway lengths. Lot dimensions can be controlled through minimum lot size, minimum lot frontage, set back requirements, etc.

2. Subdivision Regulation. The following procedures and regulations are access management techniques.

a.) Site Review Process. The site plan review process can require documentation of all access points. Traffic signals, medians and on-site circulation controls can be required to ensure that standards are followed.

b.) Regulating Lot Splits and Further Subdivisions. Various types of lot configurations encourage inadequate spacing between access points. The regulation of lot splits by jurisdictions could help to ensure increased spacing between access points.

c.) Subdivision Regulation. Regulations could orient lots and access points to local streets away from the high traffic volume arterials.

3. Access Controls. Access to properties can be regulated through the following controls:

a.) Location and Design. Control the number of access points in relation to road deceleration and acceleration lanes to avoid conflict points. Provide adequate design of driveway throat length to avoid a conflict with flow of off-site traffic. Provide adequate driveway spacing requirements, corner clearance, and joint and cross access configurations.

b.) Retrofitting Non-Conforming Access. Require conformance to access control guidelines with new permit requests for new driveways, land use intensity changes, and site improvements.

4. Zoning Regulations. Zoning techniques can be used to regulate access such as:

a.) Overlay Zoning. Standards can be tailored by priority or intensity access, safety, and congestion problems with corridor overlays for access control problem areas.

b.) Flexible Zoning. Flexible zoning can allow for alternative site design, buffering, and screening between incompatible uses.

TYPE OF ACCESS MANAGEMENT PROJECTS

Projects to control access include: driveway consolidation, provision of adequate corner clearance, implementation of two-way continuous left-turn lanes, construction of frontage roads, and construction of a raised median. These techniques are desirable below:

1. Driveway Consolidation. Driveways are consolidated to limit the number of driveways per mile along a road and provide adequate spacing between driveways in order to reduce the number of conflicts.

2. Corner Clearance. This type of project involves providing adequate corner clearance by keeping or moving driveway entrances away from intersections. Improving corner clearance reduces conflicts that cause read-end accidents. In some cases driveways are moved from the main streets to side streets to clear corners.

3. Continuous Two-way Left Turn Lanes. An additional dedicated left-turn lane is provided in the center of the street to separate left-turning traffic from through traffic. Generally, these left-turn lanes are used where moderate levels of turns occur.

4. Alternative Access Ways (Frontage and Backage Roads). Access is provided to sites adjoining the main road by either frontage or backage roads. These roads separate turning movements from the through traffic on the main road.

5. Raised Medians at Intersections. Raised medians at intersections provide a center barrier near intersections to prevent some turning movements into driveways near the intersection. This reduces conflicts near the intersection.

6. Full Raised Medians. Full raised medians are barriers the full length of the main roadway that prevent both left turns and cross traffic. Full raised medians eliminate conflict points along the stretch of the median where traffic volumes are high.

RECOMMENDED ACCESS CONTROL GUIDELINES

The City should form an internal access management team to formalize a continuous access management process including: 1) the access permitting procedures; 2) identifying responsibilities; 3) reviewing development plans; 4) coordinating on planning new and relocated roadways; and preparing Access Management Plans. For SR 287, SR 387, and SR 84, a joint partnership on access control between ADOT and the City of Casa Grande will ensure that the interests of both agencies are maintained while managing access using the state and local powers to control access. Therefore, it is imperative that the City

establishes an ongoing process in cooperation with ADOT to coordinate zoning and subdivision approval with ADOT's access permitting process.

The general policies of the Access Control Guidelines are as follows:

- Traffic signals will only be installed at major intersections when warranted in accordance to the *Manual on Uniform Traffic Control Devices*.

- Left and right turn lanes should be provided on all approaches to major intersections. Left turn lanes should be provided on all approaches to intermediate intersections. Right turn lanes should be provided where warranted by projected traffic demands at arterial-collector and arterial-local intersections.

- The collector street network should provide access to streets with intersections on SR 287, SR 387, and SR 84 as part of land use development.

- Existing driveway access points should be eliminated or consolidated as redevelopment occurs.

- Any median openings along state and local routes would have to be applied for through the ADOT Regional Traffic Engineer.

- The minimum spacing of signalized intersections along SR 287, SR 387, and SR 84 should be one mile in rural areas and one-half mile in urban areas.

ACCESS APPLICATION PROCEDURE ON STATE ROUTES

The police power to grant or deny access to SR 287, SR 387, and SR 84 rests with ADOT's District Engineer. Thus, the district should be brought into any discussion of new access to the highway early in the development process. Moreover, it is important that coordination with ADOT and the City be established to ensure that interests of both agencies are maintained. The following access application procedures are to be followed:

- The county or municipality informs ADOT of pending developments as soon as possible. This should occur through written notification to the District Engineer.

- ADOT and the municipality coordinate and agree on the access which will be allowed. Department staff should attend regular meetings that may have any traffic impacts regarding state routes through the city.

- Following ADOT Traffic Impact Study guidelines, a traffic impact study is prepared by the developer for the development. In addition to the information required under the guidelines the impact study should include the type of access requested relative to the allowable access, the type of proposed traffic control, the

distance to the nearest intersection on state routes in both directions, and alternative access available, and the need.

- The ADOT District Permits Engineer, in coordination with the ADOT Regional Traffic Engineer, and local government, approves or denies access.

ACCESS MANAGEMENT PLANS

Access management plans should be prepared on selected city streets and for state routes. These plans should include

- An introduction defining the study corridor and discussing the purpose of the access management plan.

- An existing conditions section presenting traffic and geometric conditions on the highway under evaluation.

- A specific access management plan including signal locations, driveway access policies, median type and location, and median break spacing. The plan should be presented in both tabular form and on aerial photos.

- An implementation section outlining how the access management plan will be carried out including responsibilities and intergovernmental cooperation.

- A procedure to adopt the access management plans including how the plans can be updated.

The access management plans should also include a comprehensive review of existing driveways to identify driveways which have not been permitted and driveways which can be consolidated as redevelopment occurs. Those driveways which have not been permitted should be closed by the City and ADOT for city streets and state routes, respectively. The access permitting process should be coordinated with the requirements in Chapter 9, Traffic Impact Analysis.

LAND USE AND LOCAL ACCESS

The City should use its zoning and subdivision powers to influence the location and design of access to the state routes. The concept for access to adjacent properties in regard to how these properties currently access city streets to state routes and how they can access the highway in the future should be carefully reviewed. A critical issue will be whether to maintain existing access points or relocate access points. The concept of relocating some existing access points to maintain a minimum spacing between access points must be carefully examined in order to ensure that property rights are upheld.

RECOMMENDED PRACTICE

One element of current access management practice includes driveway spacing minimums for principal arterial, minor arterial, and collector streets. The standards need to be updated to include all functional classification system roadways defined in the 2000 Casa Grande Transportation Plan. The recommended clearances are presented in Figure 8-1.

In addition, a new driveway or a driveway with changed access should not be allowed under the following conditions:

- Within 10 feet of any commercial property line, except when it is a joint-use driveway serving two abutting commercial properties and access agreements have been exchanged and recorded by the two abutting property owners
- Within 25 feet of a guardrail ending
- Within 100 feet of a bridge or other structure, except canal service roads
- Within the minimum spacing as established in this section
- When adequate sight distance cannot be provided for vehicles on the driveway attempting to access the street since those movements will be prohibited
- When the nearest edge of any driveway flare or radius must be at least 2 feet from the nearest projection of a fire hydrant, utility pole, drop inlet and/or appurtenances, traffic signal, or light standards
- For parking or loading areas that require backing maneuvers in a public right-of-way, except for single-family or duplex residential uses on local roads

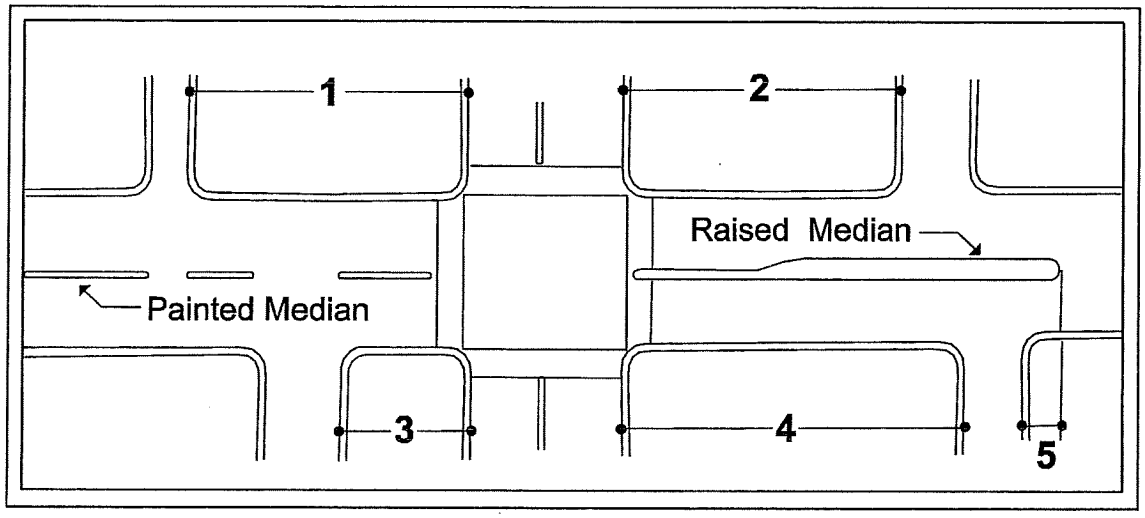
If a property has frontage on more than one street, access will be permitted only on those street frontages where standards contained in this manual and other City Regulations can be met.

If any access point meeting these standards cannot serve a property, the City may designate one or more access point(s). This designation can be based on traffic safety, operational needs, and conformance to as many of the requirements in these guidelines as possible. This does not constitute a guarantee by the City to provide access to a property.

Exceptions may be made by the City in cases where the application of these standards would create an undue hardship to the abutting property owners and good traffic engineering practice can be maintained.

FIGURE 8-1. MINIMUM CORNER CLEARANCES

(Distances Measured From Near Side Of Street To Near Side Of Driveway)



1 Subject intersection to downstream driveway (without median)

2 Upstream driveway to subject intersection (with median)

3 Upstream driveway to subject intersection (without median)

4 Subject intersection to downstream driveway (with median)

5 Downstream driveway to median break

Signalized Intersection			
Item	Principal Arterial Minor Arterial	Major Collector Minor Collector	Local
1	230	175	50
2	115	85	50
3	230	175	50
4	230	175	50
5	75	0	0

Stop Sign Controlled Intersection			
Item	Principal Arterial Minor Arterial	Major Collector Minor Collector	Local
1	115	75	50
2	115	85	50
3	85	85	50
4	115	75	50
5	75	0	0

Driveway Location Coordination

The location of access for properties on opposite sides of the highway shall be coordinated so that they do not interfere with each other.

- Driveways should be located directly opposite each other to ensure that they share a single access location.

- Where lots are not large enough to allow access points on opposite sides of the street to be aligned, the center of driveways not in alignment will normally be offset a minimum of 150 feet on all collector roads and 330 feet on all industrial, major, and arterial roads. Greater distances may be required if left turn storage lanes require them.

- Joint access will be required for two adjacent developments where a proposed new access will not meet the spacing requirements set forth in this section. Casa Grande must approve joint access.

APPENDIX A. CURRENT ACCESS MANAGEMENT PRACTICE IN CASA GRANDE

Access management is included in Chapter 17.56, Off-Street Parking, of the *Casa Grande Municipal Code*. The applicable sections are repeated here.

17.56.60 Drive access-Approval required for alteration

The city encourages sharing access drives between separate parcels. Some of the following standards may be relaxed if shown during the site design review process that more efficient design can be accomplished without jeopardizing the public's health, safety, and welfare. All changes are subject to approval by the planning and zoning commission. All drive accesses shall be approved by the city engineer for width and location. (Ord. 1178 § 6.10.2(E), 1987)

17.56.70 Drive access-required when

All nonresidential off-street parking spaces shall have access from a drive access and not directly from the public street. Access drives shall be not less than twenty-four feet in width for two-way traffic nor less than twelve feet in width for one-way traffic. Residential drive accesses shall be not less than ten feet in width. (Ord. 1178 § 6.10.2(F), 1987)

17.56.80 Drive access-Required distance from intersection

Driveway access distances from street intersections shall be subject to the minimum dimensions set out in Table 17.56.080. (Ord. 1178.39 § 2 (part), 1990)

17.56.090 Drive access-Required spacing

Drive accesses to a public street except for single, two-family and townhouse dwellings shall be located as measured from inside of drive to inside of drive according to the specified distances, set out in Table 17.56.090, unless granted approval by the planning and zoning commission. (Ord. 1178.39 § 2 (part), 1990)

TABLE 17.56.090. MINIMUM DRIVEWAY SPACING
(Centerline to Centerline)

Facility	Land Use	Min. Spacing (Feet)
Principal Arterial:	Commercial; High Density/High Activity	200
	Industrial/Office Park; Low to Moderate Activity	275
Minor Arterial:	Commercial; High Density/Activity	150
	Industrial/Office Park; Low to Moderate Activity	230
	Multifamily Residential; Low to Moderate Activity	150

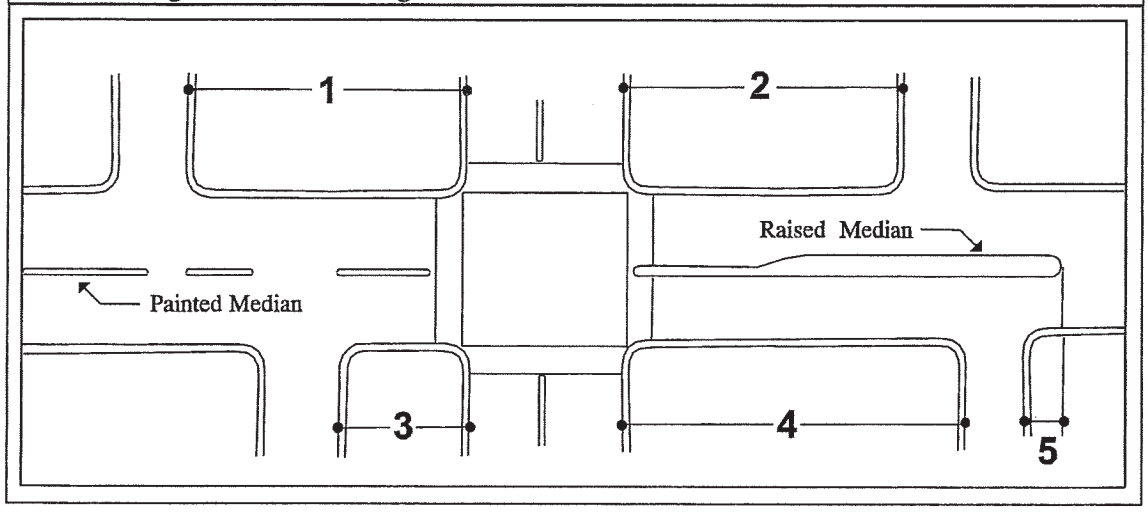
17.56.100 Drive access-Number required

Each property shall be allowed at least one drive access for each one hundred feet of street frontage. Single-family uses shall be limited to one drive access per property. These conditions shall apply unless otherwise granted approval by the planning and zoning commission. (Ord. 1178 § 6.10.2(I), 1987)

TABLE 17.56.080. MINIMUM CORNER CLEARANCES

Facility	Intersection Control Dimensions (Feet)				
	1	2	3	4	5
Principal Arterial (S)	230	120	230	230	100
Minor Arterial / Collector (S)	175	85	175	175	0
Principal Arterial (U)	120	120	85	120	100
Minor Arterial / Collector (U)	75	85	85	75	0

Note: S=Signalized, U=Unsignalized



APPENDIX D
2001 CASA GRANDE MULTIMODAL TRANSPORTATION STUDY TRAFFIC IMPACT ANALYSIS PROCEDURES

9. TRAFFIC IMPACT ANALYSIS PROCEDURES

This chapter has been established to provide uniform guidelines for preparing Traffic Impact Analysis (TIA) for new developments or additions to existing developments within the City of Casa Grande. These procedures will provide the developer, the developer's consultant, City Council and staff with information necessary to provide a balance between land use and transportation infrastructure needs. The procedures presented are based on those from the 2000 Pinal County Transportation Plan.

PURPOSE

In general, the purposes of the TIA procedures are to:

- Provide information to the permit applicant on specific requirement of the analysis
- Ensure consistency in the preparation and review of TIA reports

REQUIREMENT

A TIA for City streets will be required for all new developments, or additions to existing developments, where the ultimate development of the site generates 100 or more trips per average weekday. A more detailed analysis will be required for sites generating 500 or more trips per day (see Table 9-1). The specific level of detail for a particular impact statement may vary according to the density of the proposed development, existing and planned development, and the existing roadway conditions. Those who prepare the analysis must obtain agreement from the Department of Public Works on the specific requirements. Traffic analysis for developments on State highways must be performed in accordance with ADOT's *Traffic Impact Analysis for Proposed Development*.

TABLE 9-1. TRAFFIC IMPACT ANALYSIS REPORT REQUIREMENTS

	Standard Report (500 or more trips per day)	**Limited Report (100 or more trips per day)**
Proposed Development	X	X
Study Area	X	
Analysis of Existing Conditions	X	X
Future Traffic Forecasts	X	
Traffic and Improvement Analysis	X	
Site Access	X	X
Level of Service	X	
Improvement Analysis	X	X
Traffic Control Needs	X	X
Traffic Safety	X	X
Improvement Costs	X	X

The analysis of roadway improvements in the TIA will also follow the access management guidelines as discussed in Chapter 8, Access Management.

The City makes the final decision on the requirements for a TIA. A developer will first estimate the number of vehicle trips generated by the development to determine if a TIA is required. The developer must obtain concurrence from the Department of Public Works on the number of trips generated by the development.

COORDINATION

The preparer of a TIA must coordinate with the Department of Public Works and, where appropriate, Pinal County and ADOT. At least one meeting must be held with the Department of Public Works to review the scope of the analysis and to agree on specific requirements.

TIA REPORT CONTENTS

Proposed Development

The Traffic Impact Analysis report should include a description of the following:

- Proposed site location and site plan
- Land use
- Development phasing

A map of the study site is required. The description of the proposed development should provide as much detail as possible including:

- Specific tenants, if known
- Specific types of uses such as banks, fast food restaurants, etc.
- Intensity of each land use in terms of number of dwelling units or square foot of gross building area

The projected opening date for the proposed development must be included. In the case of a large phased development, the specific project completion dates for each phase must also be included.

Study Area

A description of the existing and future land uses in the study area must be described in the TIA report. The study area will vary according to the extent of the proposed development. A large development will generate more traffic and influence a larger geographical area

than a smaller development. The project type and size in accordance with the criteria in Table 9-2 will determine the minimum study area. The preparer of the TIA must contact the Department of Public Works to obtain agreement on the study map. A map of the study area is required.

TABLE 9-2. CASA GRANDE TIA STUDY AREA REQUIREMENTS

Ultimate Development Characteristics	Study Horizons[a]	Minimum Study Area On the City Road(s)[c]
Small Development	– Opening year	– Site access drive – Adjacent signalized intersections and/or major unsignalized street intersections
Moderate, single phase 500 – 1,000	– Opening year – 2-5 years after opening	– Site access drive – All signalized intersections and/or major unsignalized street intersections within ½ mile
Large, single phase >1,000 peak hour trips	– Opening year – 5 years after opening[b] – 3-10 years after opening	– Site access drives – All signalized intersections and/or major unsignalized street intersections within one mile
Moderate or Large Multi-phase	– Opening year – 5 years after opening[b] – 3-10 years after opening	– Site access drives. – All signalized intersections and major unsignalized street intersections within ½ mile

(a) Assume full occupancy and build-out.
(b) Not required if the traffic impacts of the project are fully mitigated 10 to 15 years after opening with existing conditions plus 5-year programmed improvements.
(c) An enlarged study area may be required for certain projects.

Analysis of Existing Conditions

The report must include an analysis of the existing roadway and traffic conditions including a discussion of:

- Physical roadway conditions
- Traffic volumes

- Traffic control of roadways and intersections (stop signs, traffic signals, etc.)
- Roadway and intersection level of service
- Safety conditions

The description of existing roadway conditions should include:

- Roadways serving the site
- Roadway cross-section and lane configuration
- Lane configuration of intersection approaches
- Posted speed limits
- Location of existing driveways
- Existing traffic signal timing and phasing

Information on 24-hour traffic volumes on the major roads in the study area should be provided. With the approval of the Department of Public Works, estimated 24-hour traffic volumes can be used in the case of low volume roads. Recent and available traffic counts can be used if they are less than two years old. Several factors may be used to adjust the traffic volumes. There should be peak-hour turning-movement counts taken at all major intersections within the study area. At the discretion of the Department of Public Works the requirement for turning movement counts at low volume intersections may be waived.

Capacity analysis will be conducted for all required locations using the procedures prescribed in the latest edition of the Highway Capacity Manual (HCM).

The existing roadway system should be reviewed from a safety perspective. The three-year accident history should be analyzed to identify accident problems and patterns.

Future Traffic Forecasts

Future traffic volumes will be estimated for the roadways in the study area for both site and non-site traffic. The estimation of future traffic volumes will include:

- Generation of site traffic
- Estimation of non-site traffic (including pass-by trips, if applicable to the type of land use)
- Distribution of site traffic to other land uses and activity centers
- Assignment of site traffic to the study area roadways

Site traffic estimation will be done for each horizon year to be analyzed. Traffic volumes for the site will be estimated using the trip generation rates or equations published in the latest edition of ITEs' *Trip Generation*. Local or other trip generation rates may be used if approved by the Department of Public Works.

The distribution of site traffic to and from potential origins and destinations must be estimated. The distribution should be indicated in a tabular form or illustrated in a figure as percentages of total site traffic.

The projected site traffic volumes will be assigned to the roadways using the distributions previously discussed and added to the non-site traffic. The non-site or background traffic is the traffic that would be on the roadways if the site were not developed. The non-site traffic may be estimated using:

- Trends and growth rates
- Combination of trends and the estimation of other proposed land uses
- Application of the Casa Grande traffic forecast model

The site and non-site traffic volumes will be combined to give the total estimated traffic volumes on the roadways.

Traffic and Improvement Analysis

The roadways in the study area will be analyzed using the projected total traffic volumes. The analysis of the roadways and intersections will include:

- Site access
- Level of service of the roadways and intersections
- Traffic control needs
- Improvement analysis
- Traffic safety
- Improvement costs

Site Access

The access drives should be analyzed with respect to capacity, traffic operations, and safety considerations. Access drives should be designed and located in accordance with the Department of Public Works guidelines.

Level of Service

Level of service analysis will be conducted for the major intersections for the following conditions:

- Base roadway conditions without site traffic for the horizon year(s)
- Base roadway conditions with total traffic (non-site plus site traffic) for the horizon years(s)
- Roadway and intersection improvements, if required, for horizon year(s)

The base roadway conditions include the existing conditions plus any programmed improvements that will be completed by the horizon year(s).

The level of service analysis for signalized and unsignalized intersections will be conducted in accordance with the procedures in the latest edition of the HCM.

Improvement Analysis

The roadways and intersections within the study area will be analyzed with and without the proposed development to identify any projected impacts concerning level of service and safety. The following conditions need to be noted:

- Where the roadway will operate at LOS D or better without the development, the traffic impact of the development on the highway will be mitigated to LOS D.

- Where the highway will operate below LOS D in the horizon year(s) without the development, the traffic impact of the development will be mitigated to provide the same LOS at the horizon year(s).

Roadway improvements will be required if the roadway or intersections will operate at LOS D or better without the improvement, but will operate at LOS D or worse with the improvement. For a limited TIA, the improvement analysis should focus on whether the existing surface type/condition is appropriate for the proposed development.

Traffic Control Needs

The analysis will indicate the appropriate type and location of traffic control such as stop signs or traffic signals. If a traffic signal is proposed the signal must meet traffic signal warrants. Also, if a signal is proposed the analysis will discuss the following:

- location of the signal in relation to intersections and access drives
- traffic signal actuation and phasing
- traffic signal progression, if appropriate

Traffic Safety

The TIA will include a review of roadways and site access for safety including the following considerations:

- Access drives designed to permit vehicles to enter the site without impeding traffic
- The need for auxiliary speed-change lanes
- Adequate storage length for turning vehicles
- Adequate sight distance at intersections and access drives

- Alignment of intersections and driveways opposite the site's access drives where possible
- Analysis of three years of accident data

Improvement Costs

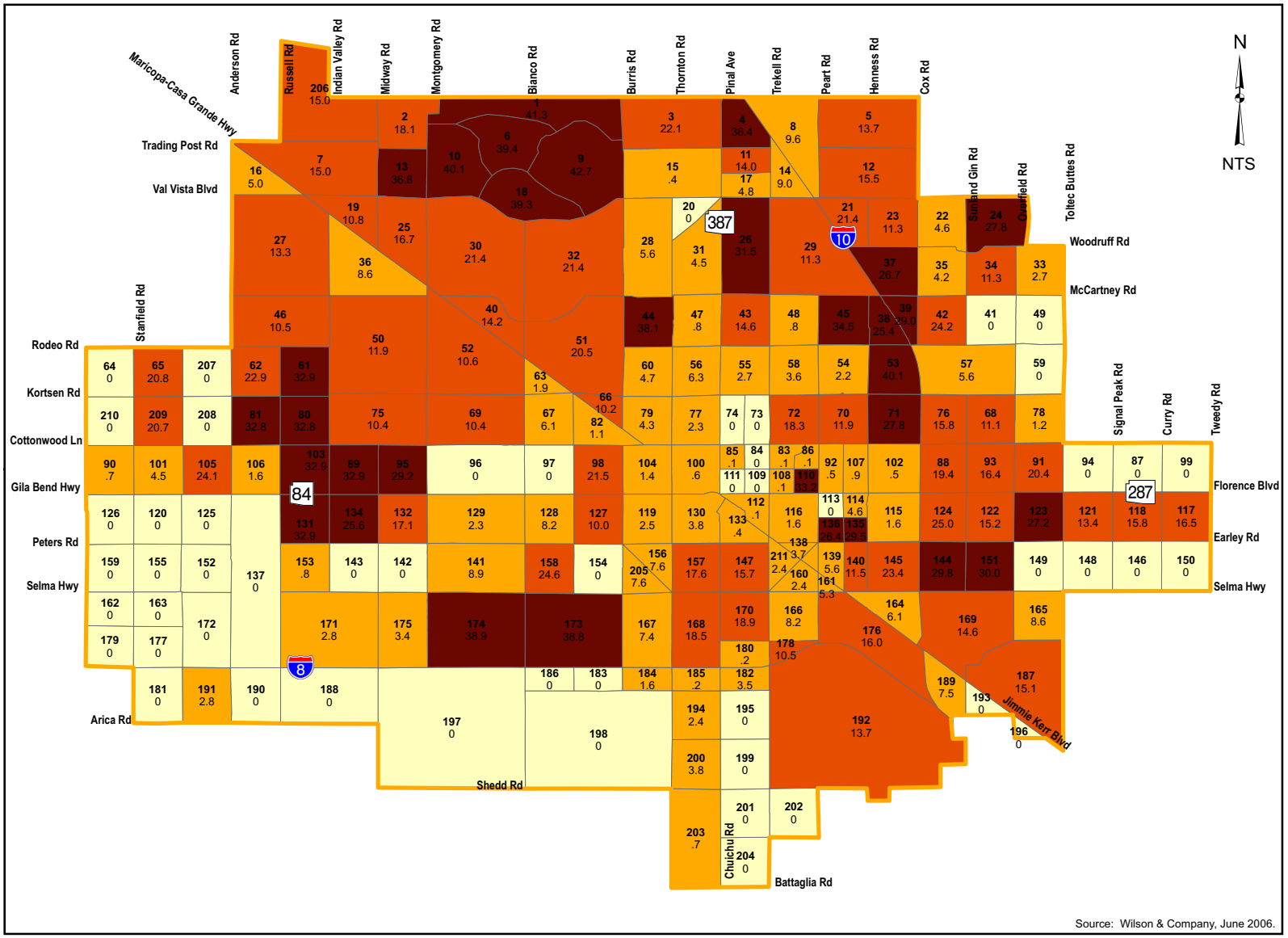
The TIA will include estimated costs of the proposed improvements and will recommend the allocation of these costs among the developer, City, County, State, and other jurisdictions, if appropriate.

Certification

The TIA will be prepared under the supervision of a Professional Engineer (Civil) registered in the State of Arizona. The report must be sealed and signed.

APPENDIX E
YEAR 2006 TO YEAR 2030
POPULATION AND EMPLOYMENT GROWTH RATES

YEAR 2005 TO YEAR 2030 ESTIMATED ANNUAL POPULATION GROWTH



Estimated Annual Population Growth Rate

- Less than 1 Percent
- 1 to 10 Percent
- 10 to 25 Percent
- More than 25 percent

Base Map Features

- Arterials
- Study Area
- XX Traffic Analysis Zone
- XX.X Percent Estimated Annual Growth

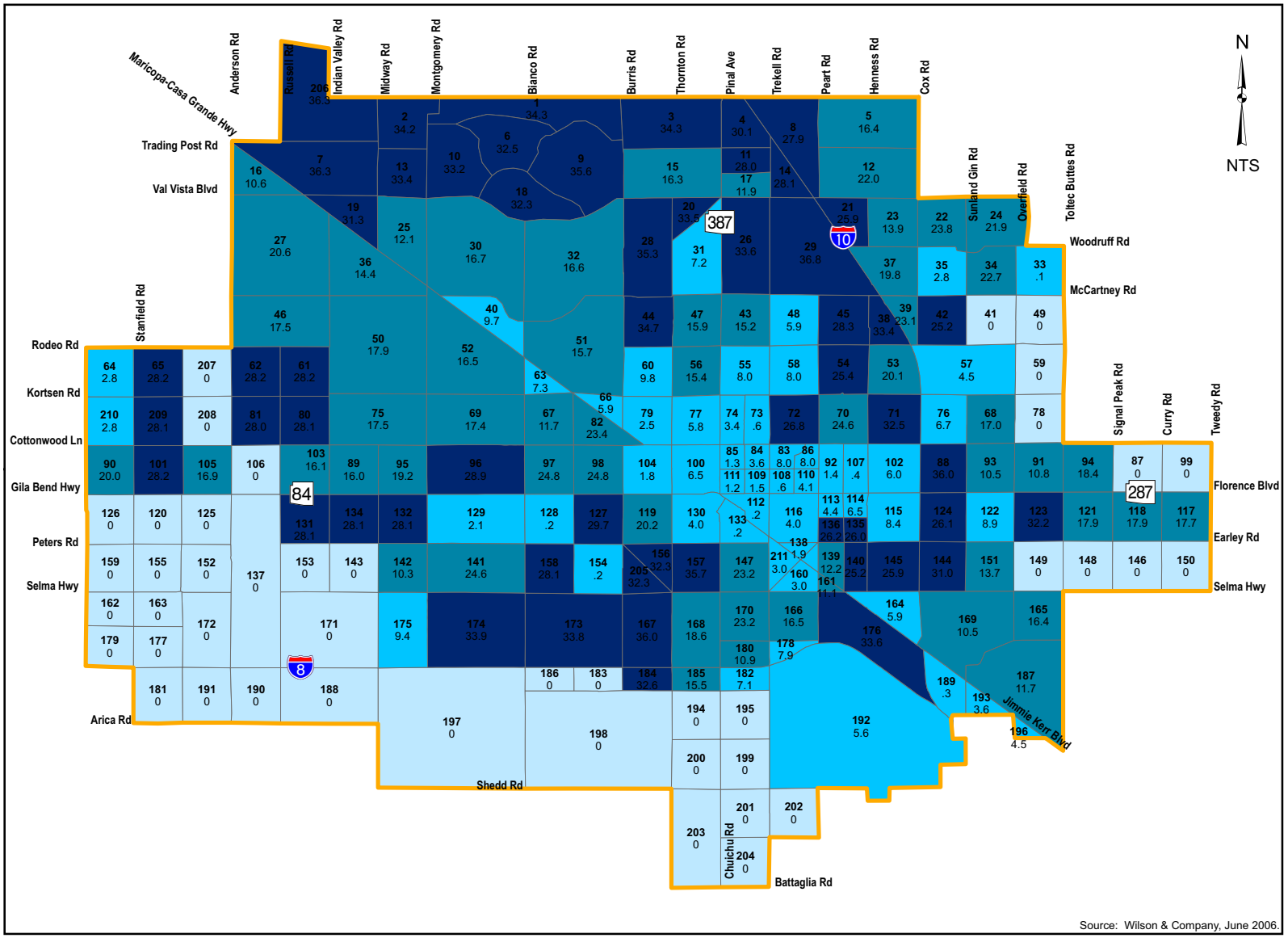
Source: Wilson & Company, June 2006.

FIGURE E-1

2006 Casa Grande Small Area Transportation Study

WILSON & COMPANY

YEAR 2005 TO YEAR 2030 ESTIMATED ANNUAL EMPLOYMENT GROWTH



Estimated Annual Employment Growth

- Less than 1 Percent
- 1 to 10 Percent
- 10 to 25 Percent
- More than 25 percent

Base Map Features

- Arterials
- Study Area
- XX — Traffic Analysis Zone
- XX.X — Percent Estimated Annual Growth

Source: Wilson & Company, June 2006.

FIGURE E-2

2006 Casa Grande Small Area Transportation Study

WILSON & COMPANY